FLIGHT

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Founder and Editor: STANLEY SPOONER.

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CONTENTS.

	PAGE
Editorial Comment:	
The Octopus of Bureaucracy	171
An Appalling Incubus	172
The Politicians Again?	172
Seven Hundred Million Steps to Victory!	174
Honours	175
Metal in Aeroplane Construction	176
The Royal Aero Club. Official Notices	178
Airisms from the Four Winds	180
Answers to Correspondents	183
Armchair Reflections. By the "Dreamer"	184
The Roll of Honour	185
The British Air Services	186
The Aeroplane of To-morrow. By L. de Bazillac	188
Personals	190
Aircraft Work at the Front. Official Information	191
Side-Winds	192
Models	198

TO OUR READERS.

The Supply of "FLIGHT." Important Notice.

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As the demand for "FLIGHT" is so great each week, it is of the utmost importance that readers should place their orders *firmly* for copies of "FLIGHT" at the bookstalls, their newsagents, or direct from the publishers, at 44, St. Martin's Lane, W.C., if they wish to secure a copy every week and avoid disappointment. The stringent Government restrictions in regard to the supply of printing paper necessitates this precaution in order that only actual numbers required are printed, and all wastage by unsold copies may thereby be reduced to a minimum, if not eliminated.

THE PUBLISHERS.

EDITORIAL COMMENT.

IT was in the pages of "FLIGHT" that the first note of alarm was sounded at the octopus growth of bureaucracy. Since we first expressed our sense of concern at the ever-increasing multiplication of departments and officials, the evil—for evil it is, in spite of all the explanations and apologies—has become so huge that the Press and the public generally has fairly taken fright at the Frankenstein monster that looms in the near distance. Lord Midleton, who can scarcely be classed as an alarmist, well voiced the public concern when he called attention in the House of Lords last week to what he described all too mildly as "the multiplication of Government offices and officials," and moved for a return of the estimated cost of all buildings under erection or contracted to be erected between January 1st and December 31st, 1916; the hotels, buildings or private houses bought, rented, or let and the number and cost of the permanent and temporary staffs employed under the new Ministries established during the war.

The Octopus of Bureaucracy.

There is so much anxiety in the country with regard to this matter that it must have been with genuine regret and concern that the public learned that, after Lord Curzon had spoken as the apologist of the bureaucratic system, Lord Midleton withdrew his motion. The main line of defence adopted was that the expenditure on these buildings and staffs represents only an infinitesimal part of the cost of organisation for war, and that if by this means (*sic*) a successful and reasonable economical termination of the war could be secured the cost would be repaid hundreds, if not thousands, of times over.

The defence is only sound up to a certain point. The mere cost of the wholesale commandeering process is the lesser evil. Lord Curzon was perfectly correct, no doubt, when he said that this was an infinitesimal part of the whole cost of the war, and if it is necessary to incur this expenditure, then the nation is willing, even anxious, to foot the bill. But there are two salient points that emerge in connection with this wholesale multiplication of departments and staffs. In the first place, there is a feeling abroad—which is, no doubt, fully justified—that the economy which is being preached at the people from every platform and hoarding in the country, is the very last consideration to weigh with the officials who jump to take advantage of the temporary powers conferred upon them, by emergency legislation. Lord Midleton himself gave chapter and verse for a number of cases in which the action of officials in commandeering houses and other accommodation would, in any private enterprise, have ensured their being shown the street as hopelessly incompetent or disregardful of the most elementary interests of their employers. While the nation does

not at all mind paying what is *necessary* to win the war, there is a very natural objection to seeing good money poured down the sewers by official ineptitude. The public realises that when great organisations have to be created out of nothing there must be *some* waste, and it would be content with fifteen shillings-worth for its sovereign. When it is doubtful if it is getting half-a-crown's worth of value for that sovereign, then it is little wonder that the spirit of restiveness is abroad.

* * *

An Appalling Incubus.

A much more serious aspect of the matter than that of the mere cost is the creation of a solid wall of vested interest in bureaucracy. At the present rate of progress we shall find before long that the nation is confronted by a Hydra-headed monster of officialism that will, unless we are very careful, suck the very life-blood out of the country. It is all very well for Lord Curzon to tell us that all appointments to the new departments are now being made on a purely temporary basis. We know all about these temporary officials, and we know that once a thing is established it requires a tremendous leverage to move it. Moreover, where you have an army of temporary officials, you also have a large number of permanent staff to control them. It follows, as night follows day, that when the temporary people are sent about their business, there is no longer a job for the permanent holders of preferment. Therefore, is it not logical to suppose that the latter will be briefed in the cause of the former, and that they will fight tooth and nail each for the preservation of his own department? Of course it is, and that is where the trouble will arise after the conclusion of the war. All these new departments have been created literally with a stroke of the pen. He who imagines that they will disappear as easily is in for the disappointment of his life. We shall find, unless the non-official part of the people takes a very decided stand in the matter, that we shall be saddled with an appalling incubus of officialism, to which the Prussian bureaucracy is a circumstance.

This may, perhaps, be regarded as extreme language. It must be remembered that a bureaucrat is a bureaucrat, whether he be British, Prussian or anything else. Scratch him and you find a despot—and a despot of the worst kind. We have only to regard what is going on all around us now to be able to realise the literal truth of the assertion. Let us take, for example, the treatment that is being accorded to the Constitutional Club at the present time. The Club was turned out of its home, practically at a moment's notice. It raised no objection. On the contrary its action, both in the letter and the spirit, was exactly what we might have expected of a body of men who put the interests of King and country first and everything else nowhere. It found a home at the Hotel Cecil and occupied quarters that, to put it mildly, were very much restricted in comparison with its own accommodation. For a time all went well, but at last the Air Board discovered that it wanted more room for expansion, and the Cecil was commandeered for its purposes. Now, there are more than 700 rooms in the Cecil, and of these the Club occupied about a dozen plus 30 bedrooms or thereabouts. The odd 670 are not enough for the housing of the army of officers and officials which the Air Board has gathered about itself, so the Club looks like being faced again with a cold hard world! It may be necessary for the purposes of the war that these 30 bedrooms should be taken away from the Club. On the merits of the particular case we are not passing judgment. But the point is that it is possible, under the now existing state of things, for the individual or the community to be literally thrown out into the street on the word of some major or minor bureaucrat. And there is, apparently, neither appeal from the decision nor redress after its execution, except as "an act of grace!" That is really where the shoe pinches. There is a remedy for every species of despotism but the bureaucratic. Once that particular kind of despotism is definitely in the ascendant, then good-bye to every species of liberty, public and personal.

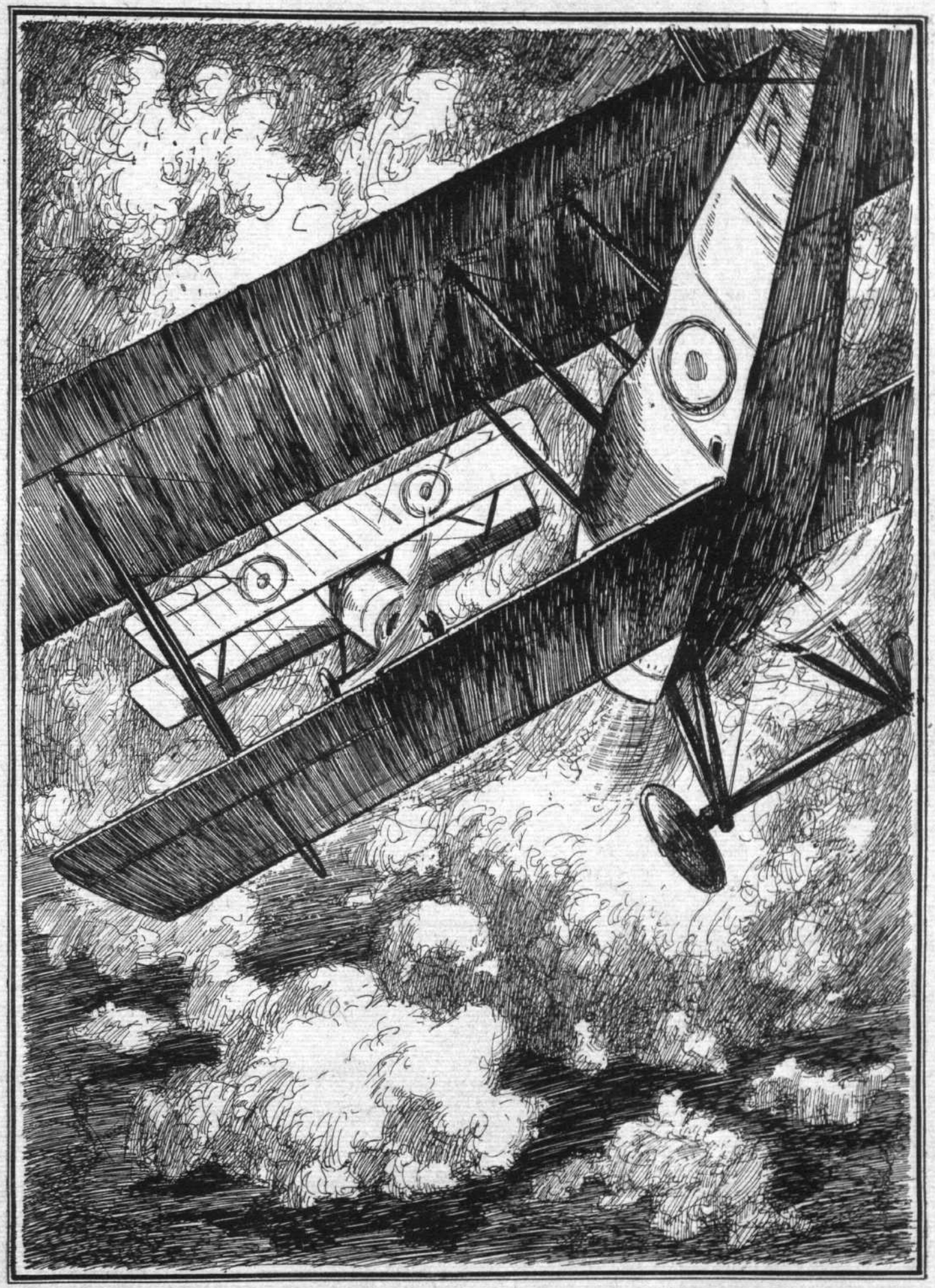
* * *

The Politicians Again?

Speaking at a War Loan meeting at Bedford the other day, Dr. Addison, the Minister of Munitions, took occasion to remark upon certain criticisms passed in the House of Commons recently because the Prime Minister was not in his place to answer questions addressed to him across the floor of the House. Mr. Lloyd George was, he explained, at that moment engaged in dealing with questions for combating the submarine menace.

"What the country expects," said Dr. Addison, "is that every effort shall be devoted to getting on with the war. There is no man in this country who is working harder for the development of our resources in combating the Germans than the Prime Minister. We have a right, I think, to expect that those in responsible positions shall spare no efforts in the work of their several departments, and we are entitled to say that so long as they are trying to get on with their business we will not see their efforts undermined by ignorant or foolish criticism. I was seriously informed the other day that we were being governed by a sort of dictatorship. Well, there never was more unmitigated nonsense spoken in this world. As a matter of fact, the War Cabinet has met nearly every day since the new Government was instituted, commonly mornings and afternoons. All those concerned with the business in hand are there."

We are entirely at one with the Minister of Munitions in this. The country has given the present Government *carte blanche* to get on with the war, and in return for the trust imposed the country expects that the Government *will* get on with it. Being as a child in politics, we may be quite wrong in the assumption, but it does seem to us that a responsible Minister of the Crown is better employed in the solution with his colleagues of vital problems concerning the war than by lolling on the Treasury Bench, waiting to answer questions of the parish pump variety. Unfortunately there are not wanting signs that the politicians are getting ready to recommence the old party game of trying to embarrass the Government. There is even talk of a General Election in the air. That would be a calamity at the present time, but it can hardly be supposed that a Government engaged on the business of a great war can allow itself to be indefinitely embarrassed by the pin-pricks of a minority of political wire-pullers. A General Election, with all its drawbacks, would be preferable to such an intolerable state of affairs as is foreshadowed by some of those who claim to be in touch with what is going on behind the scenes. It would, at least, have the effect of clearing the air and



" Instinctively I jammed my nose hard down and went as near a nose-dive as possible ; the other 'bus did the same." From the story of an R.F.C. officer of a weird "mirage collision " in the air. (Also see page 182.)

it would certainly have the result of returning to the obscurity they merit of the pitiful, pettifogging hacks who place party before patriotism.

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Seven Hundred Million Steps towards Victory!

Successful beyond all hopes is the universal verdict on the result of the War Loan appeal. That we should have been able spontaneously to raise a sum of £700,000,000 of new money after two years of war and expenditure on an unexampled and colossal scale is indeed a fine tribute to the financial strength and resources of the country. Not the least valuable aspect of the phenomenal success of the Loan lies in the moral effect it must produce in Germany. The German people have been persuaded by their rulers that Britain is almost at her last gasp, and that it is only necessary for them to hang on yet a little longer to finally achieve that victory that they believe is almost within their grasp. A better antidote to that sort of belief than the spectacle of the whole population of these islands flocking to the banks to lend their money to the State could hardly be imagined. It is particularly valuable as a contrast to their own desperate expedients to raise money for the purposes of the war. The thinking German, who realises the power of the last hundred thousand pounds in the world struggle, must see the inevitable at last—the more so as he must know that this is by no means our last effort. There is plenty more money where this £700,000,000 came from, and, what is more to the point, the people of this country are prepared to spend it in the cause of beating the Hun. Once that knowledge has penetrated the understanding of the latter, the success of the Loan will be worth half a dozen victories in the field.

From our own selfish point of view, we are able to regard this wonderful effort with a two-fold satisfaction. In the first place, we are naturally and unfeignedly pleased at the splendid demonstration of patriotism and national determination it affords. In the second, we are pleased, inasmuch as it means that there need be no falling off in the efficiency of any branch of our efforts. In this connection we, of course, have in mind first of all the flying services. These cost a great deal of money, and if we are not to be left behind in the race for the supremacy of the air they will cost more and more money as time goes on. In the success of the Loan we see an earnest for the future that, whatever may befall, it will not be for the want of money that we shall fail in the race.

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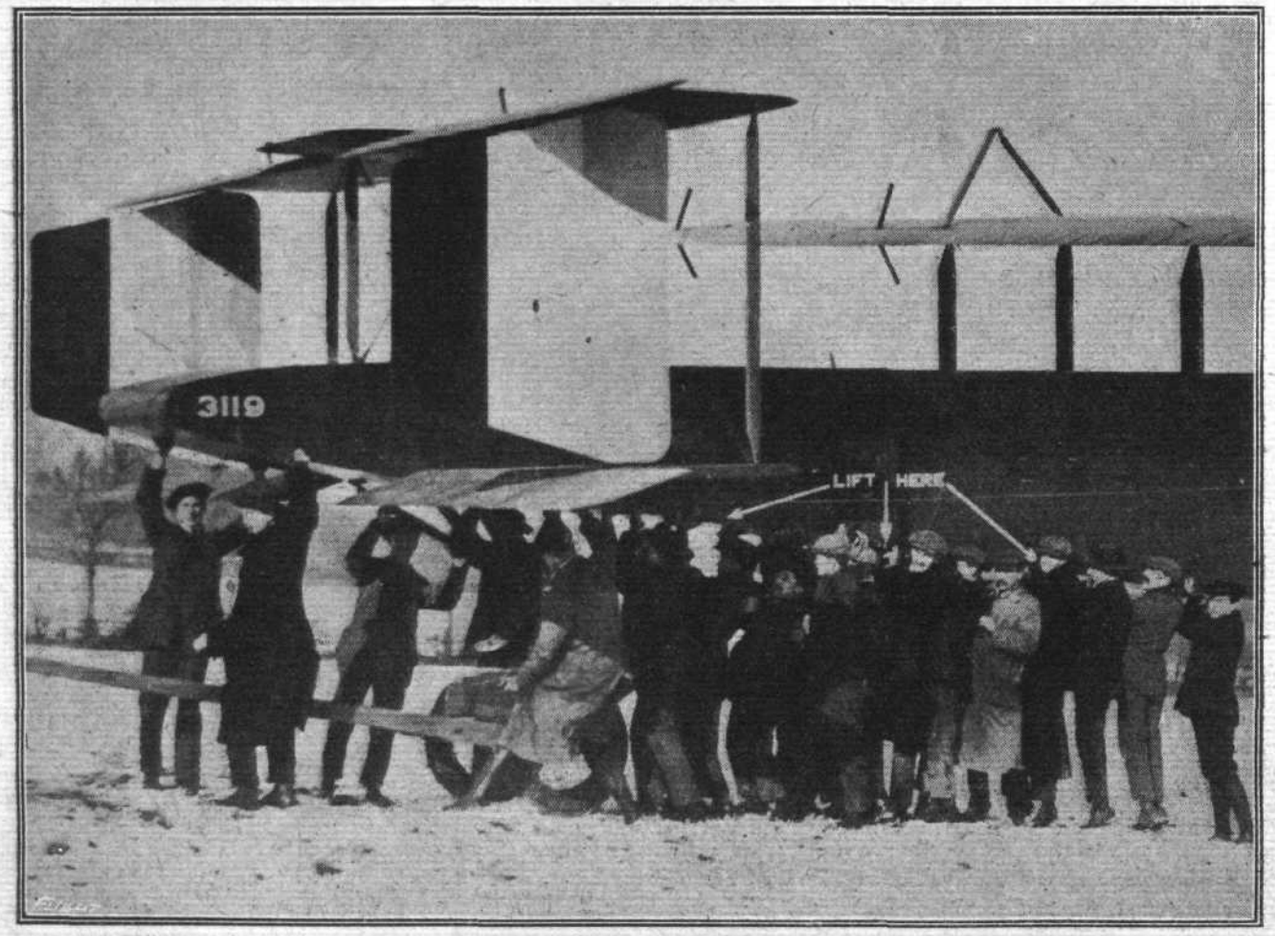
Promotion for Guynemer.

AMONG the French flying officers decorated by President Poincaré during his recent visit to Lorraine was Lieut. Guynemer, who has now brought down over 30 German machines. The President handed to Lieut. Guynemer the Cross of St. George, which has been awarded to him by the Emperor of Russia, and also informed Guynemer of his promotion to the rank of Captain. A characteristic portrait of this famous French pilot will be found on page 180 of this issue.



THE HANDLEY PAGE TWIN-ENGINED BIPLANE.—Lifting the tail. A similar photograph to the above was shown on the screen in connection with Mr. Handley Page's recent paper at the Aeronautical Society, and in connection with which the author explained that the tail is really quite easy to lift, the extra help seen in the photograph being rather due to the well-known fact that when a film is being taken, everybody wants to help—by getting into the photograph.

FLIGHT

HONOURS.

Honours for the R.N.A.S.

IN the *London Gazette* of February 16th it was announced that the King has been graciously pleased for the undermentioned officer to be Companion of the Distinguished Service Order :—

Flight-Lieut. S. J. GOBLE, D.S.C., R.N.A.S.

For conspicuous bravery and skill in attacking hostile aircraft on numerous occasions. On November 7th, 1916, he attacked an enemy scout and chased it down to 1,500 ft., when it was seen to land, crash into a fence and turn over in a field. On November 27th, 1916, he attacked four hostile scouts, one of which he brought down in flames. On December 4th, 1916, on six different occasions during the same flight, he attacked and drove off hostile aircraft which threatened the bombing machines, which he was escorting, one of the hostile machines going down completely out of control.

The King has also been graciously pleased to approve of the award of the Distinguished Service Cross to the following officers :—

Flight-Comdr. W. G. MOORE, R.N.A.S.

In recognition of the excellent work which he has done in East Africa, and especially on January 10th, 1917, when he flew a distance of 300 miles from Ubena to Mahenje. He obtained important results in bombing flights.

Flight-Lieut. L. C. SHOPPEE, R.N.A.S.

For conspicuous gallantry and enterprise during a bomb attack by aircraft on an important enemy railway bridge. A subsequent reconnaissance showed that the whole of the centre section of the bridge had collapsed into the river, thereby interrupting important enemy railway communications.

Flight-Lieut. E. R. GRANGE, R.N.A.S.

For conspicuous gallantry and skill on several occasions in successfully attacking and bringing down hostile machines, particularly on January 4th, 1917, when during one flight he had three separate engagements with hostile machines, all of which were driven down out of control. On January 5th, 1917, he attacked three hostile machines, one of which was driven down in a nose-dive. On January 7th, 1917, after having driven down one hostile machine, he observed two other enemy aircraft attacking one of our scouts. He was on the way to its assistance when he was attacked by a third hostile scout. He was hit in the shoulder by a bullet from this machine, but landed his aeroplane safely in an aerodrome on our side of the lines.

Flight Sub-Lieut. R. A. LITTLE, R.N.A.S.

For conspicuous bravery in successfully attacking and bringing down hostile machines on several occasions. On November 11th, 1916, he attacked and brought down a hostile machine in flames. On December 12th, 1916, he attacked a German machine at a range of 50 yards ; this machine was brought down in a nose-dive. On December 20th, 1916, he dived at a hostile machine, and opened fire at 25 yards range ; the observer was seen to fall down inside the machine, which went down in a spinning nose-dive. On January 1st, 1917, he attacked an enemy scout, which turned over on its back and came down completely out of control.

The King has further been graciously pleased to approve of the award to the under-mentioned officer of a Bar to his Distinguished Service Cross :—

Flight-Lieut. D. M. B. GALBRAITH, D.S.C., R.N.A.S.

For conspicuous gallantry. On November 23rd, 1916, he attacked single-handed a formation of six hostile aircraft, no other Allied machines being in the vicinity. One hostile machine was shot down, a second was driven down under control, and the remaining four machines then gave up the fight and landed. In several other combats in the air Flight-Lieut. Galbraith has displayed exceptional gallantry, particularly on November 10th and 16th, 1916, on each of which days he successfully engaged and shot down an enemy machine.

(The award of the Distinguished Service Cross was announced in the *Gazette* of October 25th, 1916.)

The following award has also been approved. To receive the Distinguished Service Medal :—

Air-Mech. E. W. NELSON.

Honours for the R.F.C.

IN the list of honours and awards for services in connection with the war, announced in a supplement to the *London Gazette*, published on February 16th, the following appears :—

Military Cross.

Capt. (Temp. Major) J. T. C. MOORE-BRABAZON, R.F.C. (S.R.).

In the list of awards of the Military Medal for bravery in the field announced on February 19th the following appears :—

856 Flight-Sergt. G. W. HALSTEAD, R.F.C.

Included in the list of those to whom the Military Medal has been awarded but who have died since the award of the medal to them by the Commander-in-Chief in the Field, appears the following :—

351 Flight-Sergt. T. F. B. CARLISLE, R.F.C.

Legion of Honour for General Trenchard.

IT was announced on February 14th that, among the honours conferred by the President of the French Republic on British officers for distinguished services during the course of the campaign, was the Croix de Commandeur of the Legion of Honour to Major and Brevet-Col. (Temp. Major-Gen.) H. M. Trenchard, C.B., D.S.O., A.D.C., R. Scots. Fus., the Director of Air Organisation in the Directorate of Military Aeronautics.

Russian and Serbian Honours for the R.F.C.

IT was officially announced on February 15th that the following decorations and medals have been awarded by the Allied Powers at various dates to the British Forces for distinguished services rendered during the course of the campaign. The King has given unrestricted permission in all cases to wear the decorations and medals in question :—

Conferred by Field-Marshal His Imperial Majesty the Emperor of Russia.

September 12th, 1916.

ORDER OF ST. GEORGE.

4th Class.

2nd Lt. (Temp. Capt.) A. BALL, D.S.O., M.C., Notts. and Derby Regt. and R.F.C.

ORDER OF ST. ANNE.

3rd Class (with Swords).

Capt. (Temp. Lt.-Col.) J. G. HEARSON, D.S.O., R.E. and R.F.C.

Capt. (Temp. Lt.-Col.) P. L. W. HERBERT, Notts. and Derby. and R.F.C.

Major (Temp. Lt.-Col.) F. W. RICHEY, R.A. and R.F.C.

ORDER OF ST. STANISLAS.

3rd Class (with Swords).

Capt. (Temp. Lt.-Col.) A. E. BORTON, D.S.O., R. Highrs. and R.F.C.

Capt. (Temp. Major) R. G. CHERRY, R.F.A. and R.F.C.

Capt. (Temp. Major) A. CHRISTIE, R.A. and R.F.C.

Capt. (Temp. Lt.-Col.) P. H. L. PLAYFAIR, M.C., R.A. and R.F.C.

MEDAL OF ST. GEORGE.

1st Class.

1465 Sergt. R. B. MUMFORD, R.F.C.

364 Actg. Sergt.-Major G. THORNTON, R.F.C.

5800 Acting Sergt. J. H. WALLER, R.F.C.

3rd Class.

13687 Corpl. H. YOUNG, R.F.C.

4th Class.

6326 1st Air-Mech. J. I. T. JONES, R.F.C.

September and October, 1916.

ORDER OF ST. STANISLAS.

3rd Class (with Swords).

Major and Brevet Lt.-Col. (Temp. Brig.-Gen.) W. G. H. SALMOND, R.A.

Conferred by H.M. the King of Serbia.

September and October, 1916.

ORDER OF THE WHITE EAGLE.

5th Class (with Swords).

Temp. Capt. C. K. ELLIOTT-SMITH, Gen. List and R.F.C.

Lt. M. MINTER, R.F.C.

Lt. (Temp. Capt.) E. R. PRETYMAN, Somerset L.I. and R.F.C.

ORDER OF KARAGEORGE.

4th Class (with Swords).

Lt. (Temp. Capt.) LORD LUCAS, Yeo. and R.F.C.

CROSS OF KARAGEORGE.

2nd Class (with Swords).

1889 Sergt. A. FORSYTH, R.F.C.

3575 Corpl. R. JAMES, R.F.C.

Silver Medal.

4118 1st Air-Mech. G. HODGSON, R.F.C.

1513 Corpl. H. MILLER, R.F.C.

August 27th, 1916.

ORDER OF KARAGEORGE.

4th Class (with Swords).

Lt. (Temp. Capt.) J. O. C. ORTON, Norf. and R.F.C.

CROSS OF KARAGEORGE.

1st Class (with Swords).

30 Actg. Sergt.-Major W. JONES, R.F.C.

Gold Medal.

1479 1st Air-Mech. R. F. FILLMORE, R.F.C.

METAL IN AEROPLANE CONSTRUCTION.

WHILE the last few years have witnessed great progress in the improvement of the aerodynamical qualities of the flying machine, there has not been any marked advancement in the methods of construction employed. From the engineering point of view practically all the improvement has been in the utilisation of more suitable materials and fittings which are better adapted both for their purpose and for rapid manufacture than the crude contraptions which had to do duty on the machines with which the pioneers experimented ten years ago. From time to time attempts have been made to employ metal for the main framework of machines, but owing largely to the lack of support, in the way of orders, accorded to manufacturers in the past very little has been accomplished in this direction. Now, however, when different conditions prevail, and having in mind the present restrictions with regard to timber, the question is again being forced to the front, and in the following article a few considerations in connection with the use of metal construction are dealt with. In the early days, when orders were not forthcoming at all, or at best in twos or threes, wood construction did very well, was, in fact, the only practicable form. Alterations, which were many and frequent in those days, could be easily carried out, and in case of damage, a thing not totally unknown to the pioneers, repairs could be made almost by any one and, at a pinch, with any material at hand. As the industry grew everyone became so intent on improving the aerodynamical qualities of machines that the original construction was retained almost universally, and quite justly so, since it lent itself so well to experimental work. It was only on the outbreak of war that the question of reproduction began to have any real importance. Since then, however, the question of quantity reproduction has become quite as important as the military value of the machine to be reproduced, and ways and means will have to be found, which will not only speed up the output, but also render the aeroplane a better engineering proposition.

If a parallel in another line of engineering were required, it would only be necessary to turn to the motor car. The early ones had wood frames, which were followed by reinforced wood frames, the latter being in turn supplanted by the channel steel frame. It is not necessarily suggested that the channel steel form will prove the solution of the problem in connection with aeroplanes as it did in the case of the motor car, but try to imagine a motor car built on present aeroplane constructional lines. The idea makes one smile, yet it is quite conceivable that in the no distant future the idea of building aeroplanes of bits of wood and wire will seem quite as crude. But what about economy of production? Surely a time like the present, when orders are being received for hundreds instead of pairs of machines, is favourable for attempting forms of construction that not only lend themselves to mass reproduction, but may actually be preferable from an engineering point of view. Although there can be no doubt that the component parts of the aeroplane as built to-day are quickly and cheaply made, the question of erecting and assembling is a serious item, even when making the widest possible use of jigs and templates. Take, for instance, a *fuselage*. The sawing out and spindling of *longerons* and struts is not a lengthy operation, it is true, but consider the number of man-hours consumed in erecting and trueing up the *fuselage*. In each bay there are two diagonal wires, each divided in two by the wire strainer, which latter has taken a certain amount of man-hours to make. In each bay the wires have to be cut approximately to length, eight loops must be made in them for the wiring plates and eyes of the strainers. Ferrules must be slipped over each of the eight bent wire ends, and the free ends bent back over the ferrule and cut off. Then there is still the tuning up, with the tightening of a wire here and the slacking of another there, before the strainers can actually be locked. The number of man-hours that go into the making of an ordinary *fuselage* is, to our way of thinking, unnecessarily great.

As we have said, there are a few aeroplane builders who have turned to other materials than wood in their search for something better. Steel tube construction is, perhaps, the commonest of these. From the point of view of strength tubing is, of course, suitable enough for many purposes, but in others it does not afford the best distribution of material, such as, for instance, in a beam where, in circular sections, much too great a proportion of the material is located near the neutral axis, where it is adding weight without adding materially to the strength. For use in *fuselage* construction a tubular framework may be all that it should be as regards strength to weight ratio, but the brazing, welding or other forms of attaching the struts to the *longerons* are as cumbersome as in wood construction, while the number of bracing wires and strainers with their attendant tuning up are in very much the same position. For mass reproduction, therefore, the tubular frame has little or no advantage over the wood girder.

A form of girder very extensively employed in other branches of engineering and, in the aviation industry, by our enemies in their airship construction, is the lattice girder. After nearly 20 years of experimenting the Germans have, apparently, been unable to devise a better method, and although we are well aware that the stresses in a rigid airship of the Zeppelin type may be very different from those obtaining in an aeroplane, it does not necessarily follow that the lattice girder cannot be adapted to meet the requirements. If it can, and at the same time give the same strength to weight ratio as the wire braced wood girder, it appears to have much to recommend it from the point of view of production. The smaller component parts are stamped out in large quantities, therefore working out very economically as regards man-hours, which is, after all, the only standard by which to measure costs in times of war. If the assembling be done over jigs the erecting should not be a lengthy process if modern pneumatic riveting machines are employed, and, at the finish, we are convinced it would be found the number of man-hours required for the turning out of a complete *fuselage* had been more than halved. This may sound somewhat optimistic, but we do not think it is far wrong. Reckon up the number of man-hours required in shaping and cutting to length the *longerons* and struts, in cutting out the wiring plates and welding sockets on to them, in drawing the bracing wires, in making the loops in them, in making the turnbuckles, in securing the wires to wiring plates and turnbuckles, and in the final trueing up. Against this must be

set the stamping out of the lattice bars, "like hot cakes," to use a colloquialism, the rolling of the rails, the bending of the rails to shape over suitable formers and finally the riveting of the lattices to the rails, thus completing the *fuselage*.

Then comes the question of strength for weight. Obviously if this is very much inferior to the ratio obtained in the ordinary girder body no amount of economy in production will make up for this deficiency. As regards the material to be employed, steel is the first to suggest itself, but if weight is to be kept down it would probably be found that sections would be obtained, which were so thin as to render the prevention of buckling under compressive strains difficult. Turning again to our enemies for information on what they have done, we find that aluminium alloys are the materials used in airship construction, and as there are now several very good alloys on the market in this country it may be of interest to examine what results might be expected from their use. In this connection it may be well to mention at the outset what the N.P.L. says regarding the permanence of one alloy: "The peculiar behaviour for some considerable time after heat treatment, in undergoing a gradual hardening process, has naturally given rise to some misgivings as to the permanence and stability of the alloy in the resulting hardened condition. It was considered possible that the hardening process was the first stage in a series of changes which might after the lapse of considerable time lead to the disintegration or weakening of the material. On this point it can only be said that the evidence so far obtained is entirely negative. Specimens of the alloy over two years old have been re-tested and found to give results exactly similar to those obtained on the new material, and there is at present no reason to suppose that any process of deterioration occurs in this material." As regards such properties as strength and ductility, these are possessed to the required degree, or can be provided, in several commercial alloys.

Without going into lengthy calculations of the strengths and weights of the wood girder *fuselages*, a fair standard of comparison may be obtained by taking the strength of an ash *longeron* of the dimensions generally employed, and examining what size and section aluminium alloy *longeron* is required to give the same strength. We suggest taking for a basis an ash *longerom* 1¼ ins. × 1¼ ins., as being a fair average dimension for the position of maximum stress. If the strength is calculated of such an ash *longeron*, treating it as a strut of length 20 ins., a reasonable figure for the distance between the struts of a *fuselage* near the point of maximum load, the following formula for the crippling load of a strut of any length can be employed:

$$P = \frac{f_c \times A}{l + \frac{f_c \times l^2}{\pi^2 \times E \times k^2}}$$

where P = crippling load of strut of any length l;
f_c = intensity of stress at the yield point in compression;
A = area of cross section in inches;
l = length of strut in inches;
E = modulus of elasticity in lbs./sq. in.: and
k = least radius of gyration of strut cross section.

For an ash *longeron* 1¼ ins. × 1¼ ins., A = 1.25 × 1.25 = 1.56 sq. in.

f_c for ash is taken as 10,000 lbs./sq. in.

l is taken as 20 ins., a fair average distance between *fuselage* struts.

E for ash is about 1,600,000.

k for a square = 0.289 d, where d = side of square, = 0.289 × 1.25 = .36.

We can now substitute in the formula, which becomes:

$$P = \frac{10{,}000 \times 1.56}{l + \frac{10{,}000 \times 20^2}{3.14^2 \times 1{,}600{,}000 \times .36^2}} = \frac{15{,}600}{l + \frac{4{,}000{,}000}{2{,}051{,}200}}$$

= 5,400 lbs. approximately.

Taking this figure as the crippling load of an ash *longeron* 1¼ ins. × 1¼ ins., the next step is to decide what size aluminium alloy *longeron* will be required to give a crippling strength of 5,400 lbs. Now, with the lattice girder type of construction it is possible to so space the lattices as to reduce very materially the length of *longerons* between two consecutive struts, to leave the "free" length of *longeron* so short in fact, that buckling is improbable, say 6 ins.

f_c for aluminium alloy = 35 tons = 78,400 lbs./sq. in.

E for aluminium alloy is taken as 10,400,000.

k for equal angle section, which is a reasonably good section commercially as well as mechanically, = 0.204 d, where d = one side. Take the sides of *longeron* as 1 in., then k = .204. If an equal angle section with 1 in. sides is chosen the area of this section, or in other words the thickness of the angle, has to be found, which is done by substituting in the same formula previously employed. Here we have P = 5,400 lbs. and we can therefore write:

$$5{,}400 = \frac{78{,}400 \times A}{l + \frac{78{,}400 \times 6}{3.14^2 \times 10{,}400{,}000 \times .204^2}}$$

from which A = 0.12 sq. ins. approximately. This corresponds to a standard wire gauge of about 16, which should work out quite well as regards weight.

Having now estimated the dimensions necessary to give the same strength as wood construction, there remains to find out how the weights of the two forms of construction compare. In his book "Aeroplane Design," Mr. Barnwell gives the following empirical formula for weight of aeroplane bodies: $W = .057\ l^2\ b\ d$, where l = length of body in feet, b = mean breadth, and d = mean depth. For purposes of comparison the following dimensions will be assumed: length = 15.5 ft., mean breadth = 1.75 ft., and mean depth = 1.7 ft. According to Mr. Barnwell's formula the weight of a wire braced body with wood *longerons* and struts will then be = .057 × 15.5² × 1.75 × 1.7 = about 41 lbs.

(To be concluded.)

The Exhibition of Zeppelin Relics.

ADDITIONS during the past few days to the Exhibition of Zeppelin relics now being held in the Temple Gardens, Victoria Embankment, have made it still more representative of all the Zeppelins brought down in this country. The new relics include a propeller blade and a cane device, apparently used to prevent the airship being damaged when leaving or entering the shed, from the two Zeppelins which were destroyed off the N.E. coast last November. The exhibition is to remain open for another fortnight, and those who have not done so should make a point of paying it a visit, as the proceeds will be divided among military charities. The charge for admission is sixpence.

ROYAL AERO CLUB OF THE U.K.

OFFICIAL NOTICES TO MEMBERS.

ANNUAL GENERAL MEETING.

THE Annual General Meeting of the Members of the Royal Aero Club of the United Kingdom will be held on Tuesday, March 20th, 1917, at 3, Clifford Street, New Bond Street, London, W., at 6 o'clock.

Notices of motion for the Annual General Meeting must be received by the Secretary not less than 21 days before the Meeting, and must be signed by at least five Members. The last day for the receipt of notices of motion is Tuesday, February 27th, 1917.

Committee.

In accordance with the rules, the Committee shall consist of 18 members. Members are elected to serve for two years, half the Committee retiring annually. Retiring members are eligible for re-election.

The retiring members of the Committee are :—

Griffith Brewer.
Ernest C. Bucknall.
Flight-Commander John D. Dunville, R.N.
Col. Sir Capel Holden, K.C.B., F.R.S.
Prof. A. K. Huntington.
Squadron-Commander F. K. McClean, R.N.
Squadron-Commander Alec Ogilvie, R.N.
Lieut.-Col. Mervyn O'Gorman, C.B.
Flight-Commander C. F. Pollock, R.N.

Any two Members of the Club can nominate a Member to serve on the Committee, provided the consent of the Member has been previously obtained. The name of the Member thus nominated, with the names of his proposer and seconder, must be sent in writing to the Secretary not less than 14 days before the Annual General Meeting. The last day for the receipt of nominations is Tuesday, March 6th, 1917.

SPECIAL COMMITTEE MEETING.

A Special Meeting of The Committee was held on Thursday, the 15th inst., when there were present: Prof. A. K. Huntington (in the Chair), Lieut.-Col. W. D. Beatty, R.E., Mr. Ernest C. Bucknall, Lieut.-Col. Mervyn O'Gorman, C.B., Flight-Commander C. F. Pollock, R.N., Mr. T. O. M. Sopwith and the Assistant Secretary.

Election of Members.—The following New Members were elected :—

John Ralph Abbott.
Granville Eastwood Bradshaw.
Lieut. Victor Felix Peter Bryce, R.F.C.
Lieut. Douglas Boyd Calderwood, R.F.C.
Wilfred Barnard Faraday.
Latham Hall.
Flight-Commander Thomas Hinshelwood, R.N.
Claude Kirkby.
Harold Charles Lambert.
John Dudley North.
Capt. John Joseph O'Neill Power, R.G.A.
Capt. Thomas Alexander Frederick McMillan-Scott (3rd King's Own Scottish Borderers).
Charles Leopold Samson.
Lieut. Kenyon Secretan, R.N.V.R.
Lieut. Frank Ash Yeo, R.N.V.R.

THE FLYING SERVICES FUND administered by THE ROYAL AERO CLUB.

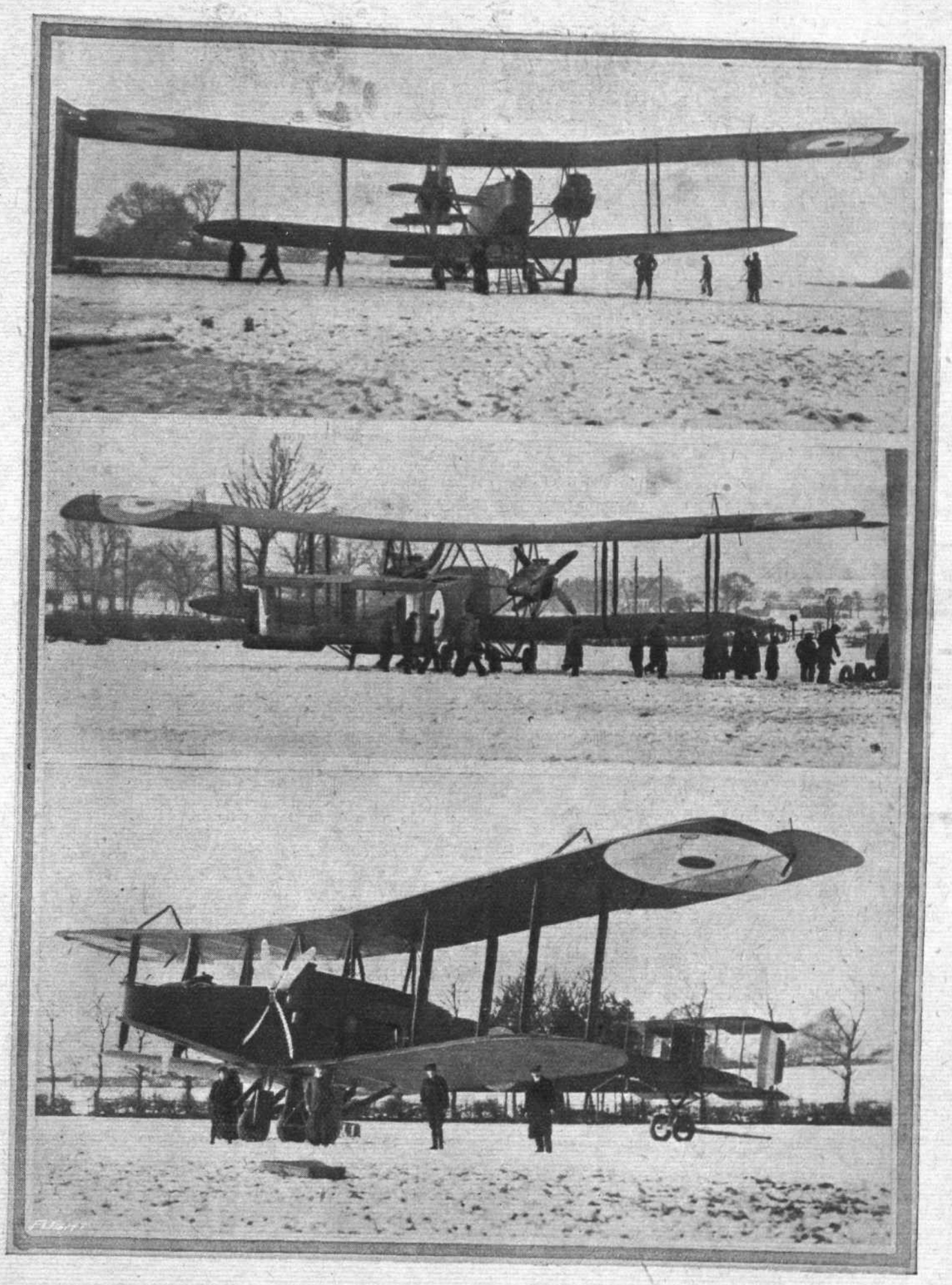
THE Flying Services Fund has been instituted by the Royal Aero Club for the benefit of officers and men of the Royal Naval Air Service and the Royal Flying Corps who are incapacitated on active service, and for the widows and dependants of those who are killed.

Subscriptions.	£	s.	d.
Total subscriptions received to Feb. 13th, 1917	11,130	9	10
Staff and Workers of Gwynnes, Ltd (Thirty-second contribution)	8	15	5
Collected by Mrs. Anderson	15	16	0
Proceeds of a Concert organised by the Officers, Non-Commissioned Officers and Men of the 3rd Reserve Squadron, R.F.C., Shoreham	14	5	0
Proceeds of the Wells Aviation Swimming Club First Annual Dance and Prize Distribution	9	0	0
Total, February 20th, 1917	11,178	6	3

B. STEVENSON, Assistant Secretary.
3, Clifford Street, New Bond Street, W.

2 1 3

Flight-Commander Captain Albert Ball, D.S.O., M.C., is presented with the freedom of the City of Nottingham, the city of his birth, in recognition of his remarkable record in air fights at the Front, Captain Ball having the further distinction of having been awarded two bars to his D.S.O. Our photograph shows the Mayor of Nottingham making the presentation to Captain Ball (1) in the presence of the Corporation, the recipient's father (Mr. Alderman Ball) (2) and mother (3).



The Handley Page twin-engined biplane.

AIRISMS FROM THE FOUR WINDS

IN the list of honours conferred by His Majesty the King of Serbia on British officers for distinguished services rendered during the war, appears the name of the Duke of Atholl, who is decorated with the Order of the White Eagle (3rd Class, with Swords).

ANOTHER distinction announced is to Flight-Commander A. Ball, D.S.O., M.C., who receives from the Emperor of Russia the Order of St. George (4th Class).

NIGHT flying is being taken in hand now in earnest in the United States. To this end searchlights, each of more than 1,000,000 candle-power, have been installed at the United States Army Aviation Field at Hempstead, New York.

IN the land of snows aviation progress has made great strides of late years, and a fine feat is now attributed to Lieut. Nagourski, who has looped the loop over Esel Island with a passenger and 540 kilos. load on his aeroplane.

No doubt there is not the same degree of excitement about the running amok of one of our own Service aeroplanes, as arises when a Hun machine is out for mischief from above, but material damage accruing from either cause would appeal to most folk as being, in the result, about on a par. Mr. Newdegate, M.P., anyhow thinks this way upon the subject, and he has elicited from the Parliamentary Secretary to the Air Board a promise of "consideration" as to compensation in the event of aeroplanes of our own Forces doing damage to fences or buildings in the United Kingdom. Hitherto Mr. Newdegate avers that, in certain cases, compensation has been refused because the damaged property has not been insured. He may well claim to know whether it is intended that people shall be obliged to insure against damage done by our own aircraft as well as by that of the enemy.

By courtesy of "La Guerre Aérienne."

Capt. Guynemer, the French pilot who has brought down such a number of German machines—over 30—and who has just received, at the hands of President Poincaré, from the Emperor of Russia the Cross of St. George, he at the same time being promoted to the rank of Captain.

THAT Defence of the Realm Act is, indeed, a wonderful measure in its power to cover the tracks of inefficiency and ineptitude. The "win the war" part of it is quite all right, but the openings to abuse and bureaucracy it promises is one that has to be reckoned with more and more, as its powers are being exercised in directions hardly (it is to be hoped) contemplated by the framers of the Act. Wonder whether the Government will presently bring in a scheme of national insurance for the People (capital P, please) against bureaucracy and all its accessories?

THERE is a doubt whether Capt. Burgoyne's interpolation in Parliament upon the administration of the R.N.A.S. can come on this week after all, owing to some slight infringement of one of the thousand-and-one odd forms of procedure which the running of the Westminster Club insists upon. There is always *somebody* ready to pounce upon any little omission of this sort and jump a brother M.P.'s claim. At the worst though, in this case, it would be but a little breathing time in the form of a postponement. The exact form of Capt. Burgoyne's motion "on going into Committee on the Navy Estimates" is interesting, and is as follows: "In the opinion of this House, having regard to past difficulties, the Royal Naval Air Service should, for all except executive functions, be placed under the Air Minister and his Board, with a view to the establishment in the near future of an independent and Imperial air service."

WHAT shocking cases of criminality in the young are now being reported from various parts of the country. Here is a "norrible" example to be noted from York (as per request of the Chairman of the Bench) by any hardened criminals of the same type who may be tempted to go and do likewise: Two boys, Christopher Bradley and Colin Henry Adams, were, so the story runs, charged—the former with taking a photograph of an airship, and the latter with having it in his possession. Adams was out with his father in a motor car when he saw an airship. On arriving back home he found Bradley had taken a photograph of the craft with a pocket camera. Two prints were taken from the negative and shown to some workmen. This led to the prosecution being instituted. The case was dismissed on payment of costs.

THESE blimps of ours will have a lot of responsibility upon them before the end of the war. But why not let a little light in upon our achievements in this direction by allowing a few photographs to be published? They *might* scare the Huns horribly.

FROM *The Archie Gazette*, a trench journal published by the Anti-Aircraft men at the Front:—

(*Captain and crew on sinking ship.*)

CAPTAIN: "There is no hope. Will someone offer a prayer?"—*Silence everywhere.*

CAPTAIN: "Will someone sing a hymn?"—*Silence as before.*

CAPTAIN: "Boys, we must do something religious. Let's have a collection."

GERMAN officialdom is getting a bit nervy about the next war loan, and our own little 700 million stunt will hardly carry much comfort to the long-suffering German public as to the wisdom of their pouring more of their belongings into the bottomless pit for the upholding of Prussian militarism and all it stands for. Canvassing for the new loan is already cropping up in various ways, and amongst one of the new

THE HANDLEY PAGE TWIN-ENGINED BIPLANE.—A view of the *fuselage* from the front.

battle-cries is the assurance by the Bavarian Minister of War, Baron Kress von Kressenstein, that home air defence is now so organsed that public opinion as a whole can be easy, so far as protection can be provided, although further hostile attacks are not excluded. Looks as if an early fillip to our air reprisals might give fresh vigour to the doubts of that ultimate victory which already appear to have taken a hold upon the victims of Hohenzollern rule.

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In the death of Lieut.-Col. Dudley Sampson, at the age of 77, a very notable figure in Indian warfare, dating back to 1857, when he joined up with the 34th Border Regiment, passes away. Col. Sampson saw a great amount of fighting in the Mutiny, and was a hunter and traveller of vast experience. He was a keen follower of the development of aviation, and in his only surviving son, Capt. Noel Carleton Sampson, Dragoon Guards and R.F.C., the country has a fit successor to the late colonel's ability and courage. It was the deceased who last November, when a Hun aeroplane made a cut-and-run bombing expedition over London, wrote to the Press saying: "If anyone had told me 59 years ago to-day, when we were in the thick of it at Cawnpore, that I should live to celebrate this anniversary by being bombed here, I should have had him put in the guard-tent as a dangerous lunatic. But we live in weird times."

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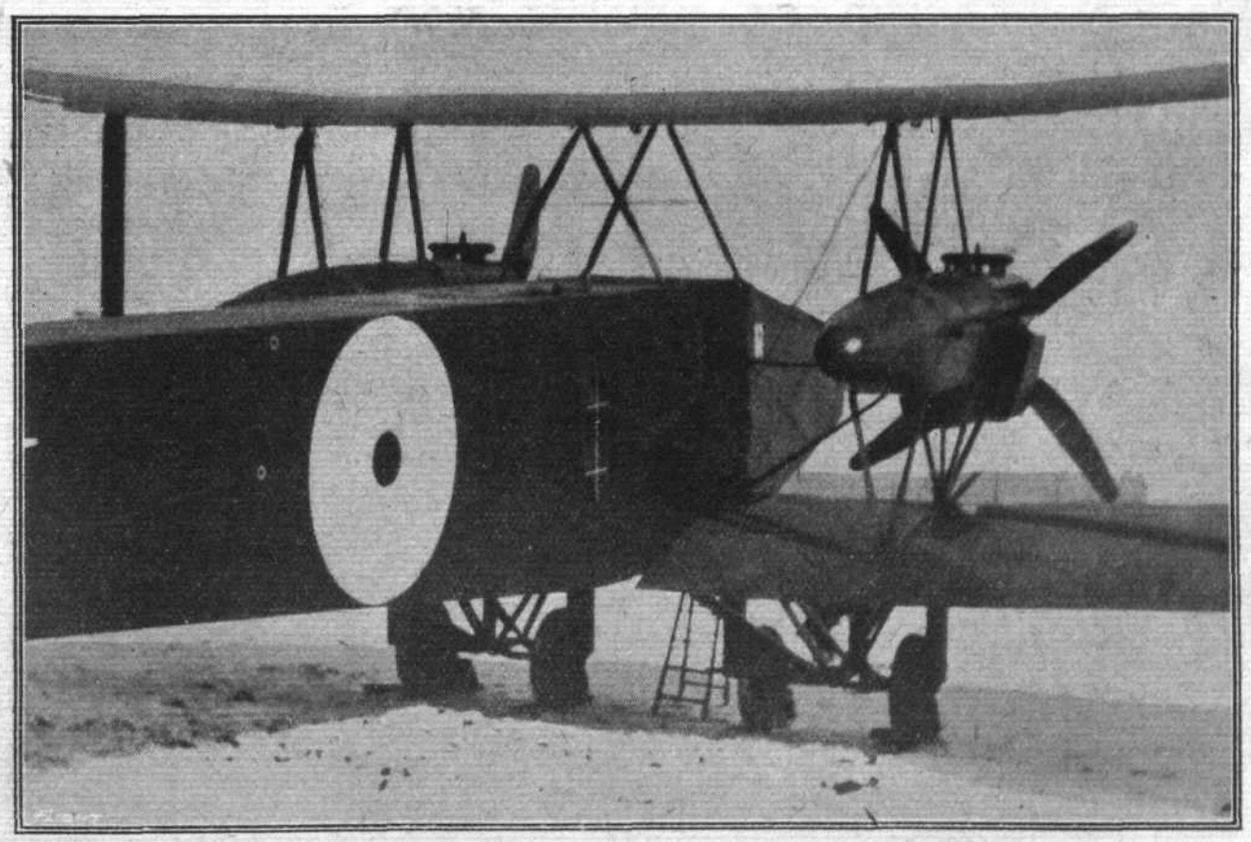
With prompt appreciation of the tactics of the insurance brokers to fill the void up to March 1st against aircraft risks



THE HANDLEY PAGE TWIN-ENGINED BIPLANE.—A rear view of the engine mounting and fore part of the *fuselage*.

the Government wisely decided, close on the heels of their first announcement, that their 50 per cent. reduction in rates should take effect forthwith, so that Lloyd's and the other insurance pickers-up of trifles have in like manner come into line, and are prepared to take risks at the reduced rate demanded by the State. But why anybody should bother to go outside the Government air raid policy is really a thing "no fellar can understand."

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"P.B." publishes in *The Imperialist* of last week his second instalment of "My Life," and this is perhaps even more interesting than the first, as it sets forth matters of more recent happening within the scope of easy remembrance by the average gleaner of news of the day. A third instalment this week is to conclude the story, and in the meantime Mr. Pemberton Billing makes it fairly clear that most people are under a misunderstanding as to his intention to resign his seat in Parliament and seek re-election. In his own words he puts it: "So far I have held five meetings in the constituency and in each case a unanimous vote of confidence in me was passed. If this proves to be the case throughout, I shall have to consider the numerous representations I have received not to force an election on the constituency until a new register is formed."

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WE may therefore look forward to some caustic interpellations on the motion of Capt. Burgoyne as to the administration of the R.N.A.S.

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INTEREST in Lady Drogheda's Aircraft Exhibition at the Grosvenor Gallery shows no falling off, and during the past week amongst the many notable visitors to see this really delightful show have been Her Majesty Queen Alexandra, attended by the Hon. Charlotte Knollys, the Grand Duchess George of Russia and her daughters, Mr. Winston Churchill, Lady Jellicoe, Lady French, Lady Robertson, &c. Those who do not wish to miss the chance of seeing the exhibits should pay their shilling quickly, as it will not be possible to keep the show open for many weeks longer. And don't forget the proceeds go to the Flying Services Fund (administered by the Royal Aero Club) and to the Red Cross.

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ALL the to-do in the Press just now about the acknowledgment by the Huns of the failure of the Zeppelins is uncommonly suspicious. Of course, President Wilson had to be dragged in. But methinks it is a case of "trust them not." There is a lot of method in these Uriah Heepish inspired moralisings. If the Huns by these tactics imagine they are likely to lull our watchfulness to sleep they will probably get a rude awakening should they suddenly shift round to their old way of thinking.

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BY-THE-BYE, it is more than gratifying to know officially, that all the machines which our pilots used to strafe the Zepps. with, were fitted with British magnetos, designed in Britain and made by British labour in all-British factories. It would nevertheless have had a touch of irony in it had the destruction of the pirates been brought about with the help of a few accessories "made in Germany."

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QUITE a nice little proportion—six out of thirteen—for the R.N.A.S. of the Honours announced in the *Gazette* last Friday, including one D.S.O., four D.S.C. and a D.S.C. bar.

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A "Mirage" Collision in the Air.

THE following remarkable story of a mirage in the clouds is told by a young Flying Corps officer in the following letter to his father. The incident has received pictorial treatment in this week's "FLIGHT" on page 173 :—

"I had often wondered what it would feel like to see a machine coming straight for one and to know that a collision was inevitable. I had the experience this afternoon, only the collision did not take place. I was on patrol with five other machines over the lines—by the way, I am writing this like a novel, but I feel like it—and had just gone into a cloud bank. Just before going in I saw the 'bus on my right turning to cross in front of me. All of a sudden I saw a machine just the same as my own appear out of the cloud about 50 ft. away, making straight for me. *Instinctively I jammed my nose hard down and went as near a nose-dive as possible; the other 'bus did the same.* I turned; the other turned into me. I was in a cold perspiration all over by this time, so I thought 'Here goes; if I am going to crash it might as well be complete.' So straight for it I went. We got closer and closer, and biff! my machine and—its mirage in the clouds met.

WHEN the responsibility for too much light gets to the acute stage of magisterial interviewing, excuses, from the ca upwards, are quaint and varied. We think, however, a full 2 ozs. extra bread rations has been earned by a well-known Greenock man who was charged at the local court on Monday last with having infringed the lighting order. He pleaded that when baby boys were being born into the world domestic arrangements were usually upset. That happened on this occasion, and he thought what was going on inside the house was much more for the good of the country than any harm caused by the lights showing outside for a quarter of an hour. But the advent of the offspring cost him a pound just the same.

TEN YEARS AGO.

Excerpts from the "Auto." ("FLIGHT'S" precursor and sister Journal) of February, 1907. "FLIGHT" was founded in 1908.

FURTHER PROCEEDINGS OF THE LA VAULX AIRSHIP.

Further excursions were made by the La Vaulx airship on the 10th inst., in spite of the mist which prevailed. The first flight was made to the village of Montesson for the purpose of giving the inhabitants a view of the machine. The second took place to Vesinet and back again. On the return from the second excursion the petrol feed-pipe to the carburettor of the motor broke in two, the airship had to be brought to rest, and the defect remedied with a bit of rubber tubing, after which the motor was restarted, and the airship under her own power was brought back to the aerodrome. This forms the fifty-third day that the balloon has remained inflated, and only 55 kilogs. of ballast was carried. On the previous Friday the La Vaulx also went out at 25 mins. to 12 in the morning, and took the direction of Saint Germain at about between 50 and 70 metres from the ground. The turn was effected between Pecq and Vesinet, and 22 mins. after setting out the airship returned to the shed, after having described a big circuit of 12 kiloms. In the afternoon of the same day at 20 mins. to 5 she went out again in the exact opposite direction, *i.e.*, towards Trouville, and again returned without the slightest accident, that making the tenth occasion on which the Count de la Vaulx had been out in the airship, and the 203rd time that he has been up in the air.

THE MILITARY USE OF THE AIRSHIP.

In a lecture delivered on Tuesday last at Aldershot, Col. Capper, head of the Aeronautical Department, had some interesting remarks to make regarding the *rôle* that is likely to be played in the near future by airships. After recognising the value of both balloons and kites for collecting information within a radius of 8 miles, Col. Capper continued :—

"In the near future we may expect to see both dirigible balloons and motor-driven aeroplanes used as aerial scouts. The former suffers at present from serious limitations, and its great bulk seems to render it most vulnerable in the daytime. But it exists in the French Army, and we must take it into account.

"The aeroplane, when it comes, will be different. It will move fast and will be little liable to injury, as bullet holes in the surface will cause but little damage. It will be able to go considerable distances, even against strong winds.

"Possibly during this year such an aeroplane may make its *début*, and I think that considerable numbers will be in existence in five years' time."

◈ ◈

"It seemed like a hideous nightmare, and I can still see that machine doing its utmost to crash into me. I think I can say I have had the full horrors of a collision in the air without its actually taking place. I finally got out of the clouds, and had not the faintest idea where I was, but about 15 seconds after 'Archie' reminded me that I was a little too low over his lines. *Having got that off my chest, I think I will go to bed.*"

More Aeroplanes from the West Indies.

THE West India Committee have forwarded to the Overseas Club £819 4s. collected by Mrs. Perez, of Trinidad, to complete the payment for a second aeroplane presented by Trinidad to the Royal Flying Corps. The Combined Court, having also voted money for the purchase of a second aeroplane for British Guiana, the strength of the British West Indian aeroplane flotilla is now raised to nine.

A German Airship Lost?

THE Amsterdam correspondent of the *Morning Post* reported on February 13th that a heavy fall of snow, followed by a severe frost had caused the roof of a building at Leipzig, in which an airship was being constructed, to collapse, with the result that 40 workmen were injured.

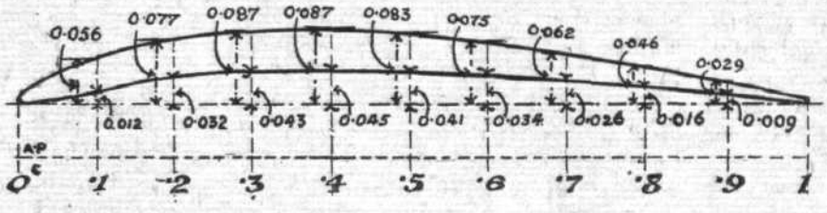
ANSWERS TO CORRESPONDENTS

[As a number of letters reach us signed with initials only, some of which do not give a complete address, we would point out that such communications cannot be dealt with in our columns. Full name and address, which will not be published, must always be given.—ED.]

A. P. (Hounslow).

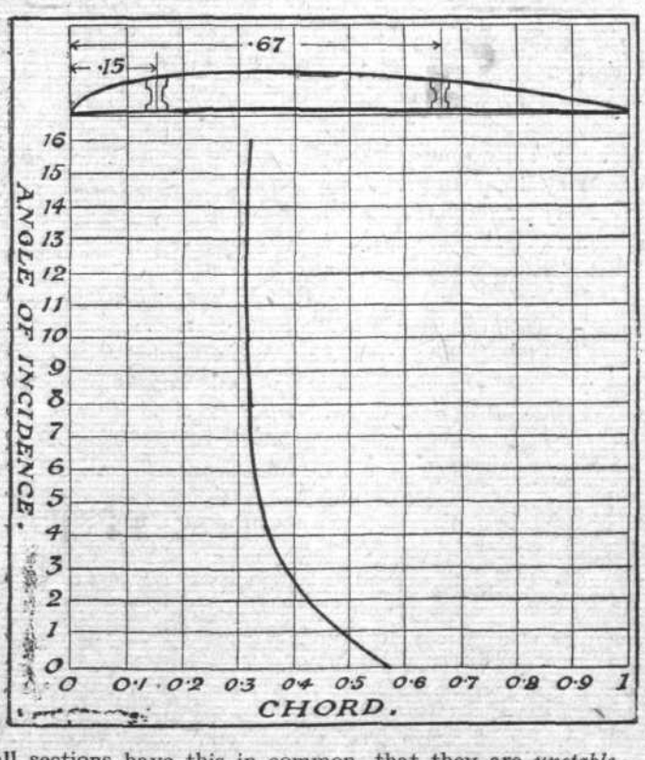
The wing section to which you refer is, we believe, that known as the Coanda section. Its dimensions are given in the accompanying diagram, which has been prepared from data published in Mons. G. Eiffel's book. In our diagram, however, the dimensions are expressed as a percentage of the chord instead of in millimetres.

The dimensions of and resistance curves for "B.F. 36" were published in "FLIGHT" of January 6th, 1916. Particulars of the engines referred to in your letter must not be published during the war. The clause in the Defence of the Realm Act referred to does not, we think, in any way prevent the taking out of patents for inventions.



L. J. P. (R.N.A.S.).

The only practicable way of determining the position of the centre of pressure of an aerofoil section is to test the section, either in full size or in model form. The latter is the method generally employed. It is not, we are afraid, possible to find the position of the centre of pressure on any given machine. The movement of the centre of pressure with the angle of incidence varies considerably in different sections, but nearly



all sections have this in common, that they are *unstable*—that is to say, when the angle of incidence is increased above the usual flying angle of about 4°, the centre of pressure travels forward, thus tending to further increase the angle; and when the angle is decreased below the usual flying angle, the centre of pressure travels backward, tending to further diminish the angle. This movement of the centre of pressure is the chief reason for fitting a tail on aeroplanes, the tail serving to overcome the inherent longitudinal unstability of the wings. A typical movement of the centre of pressure is shown in the accompanying graph, in which the centre of pressure is situated 0·57 of the chord from the leading edge when the angle of incidence is 0°, and travels forward to about 0·32 of the chord for angles from 10° to 16°.

J. L. C. (Ilfracombe).

It is not possible to state exactly the number of volumes of vapour which petrol will form from one volume of the liquid, but generally speaking the vapour at 60° F. represents about 130 volumes of the liquid. The proportion of air to petrol vapour varies, but generally speaking 2·15 volumes of petrol vapour will form an explosive mixture with 100 volumes of air.

K. R. P. (Muswell Hill).

Your first question regarding the petrol control on aeroplanes is not quite clear. Usually the bulk of the petrol supply is carried in a main tank. A service tank of much smaller capacity is mounted in some convenient place and in such a position that it is always above the carburettor. The petrol, therefore, flows from this tank to the carburettor under the action of gravity, the float in the carburettor automatically regulating the supply from the service tank. Petrol is usually forced from the main tank into the service tank by means of a hand-operated pump in the pilot's cockpit. The proportions of petrol to air are frequently regulated by small levers in the cockpit, connected *via* Bowden cable with the engine controls.

With regard to the R.N.A.S., officers on probation who are learning to fly wear a midshipman's uniform minus the white turn-backs. The R.N.A.S. buttons and badge are worn, and an eagle on the left sleeve. When he has obtained his ticket the officer wears the usual R.N.A.S. distinction marks, such as a single gold braid for a Flight Sub-Lieutenant and two braids for a Flight-Lieutenant. R.N.A.S. observers are usually, though not invariably, R.N.V.R. officers, and therefore wear the wavy gold braid.

C. T. B. (West Horsham).

(1) The machine you refer to was an F.E.2D. (2) The difference between an F.E.2B and an F.E.2D is somewhat problematical, but consists, we believe, chiefly in the type of engine fitted and in the design of the under-carriage. (3) The chief difference between a B.E.2B and a B.E.2C is that in the B.E.2B the wings were warped for lateral control, while in the B.E.2C *ailerons* are employed. Also the B.E.2B did not, we think, have its wing staggered. (4) The "S" on the rudder of the machine you have seen probably indicates that the machine was a Sopwith. (5) From your description we should say the machine referred to was one of the R.E. machines, probably R.E.7.

Phyllis (Hendon).

The drivers of the R.F.C. cars are engaged through the Transport Section of the Women's Legion, and you could obtain full particulars from their headquarters at 72, Upper Berkeley Street, W.

"Flying" (Glasgow) and **W. H. H.** (Bilston).

It is impossible to say when you will be called before the Selection Committee; it depends on the number of vacancies. You might write and enquire as to how the matter of your application stands.

B. H. P. (Bedford).

Bad sight would certainly bar the lad from becoming a Service pilot. His best course probably would be to enter as an apprentice or pupil at the works of one of the leading aircraft firms. In the meantime he should study the subject of aviation as much as possible.

T. W. R. (Saltley).

For particulars of the R.F.C. Cadet Corps, apply to the Directorate of Military Aeronautics, Adastral House London, E.C.

ARMCHAIR REFLECTIONS

BY THE "DREAMER"

WEST is in the City. I do not err in my geography, for I am not referring to that portion of London which ranges, roughly, from Piccadilly Circus to Kensington, or Holland Park, or so far in that direction as you care to go—but of West, a friend of mine.

West is in the City in order to gain (I had almost written earn) a good living and a bit over. This feat he manages to perform somewhere between 11 a.m. and lunch time, which time is anything from 12 to 2, depending principally upon whether anybody calls in to have a chat or not.

I will admit that this "working day" is supplemented by a few calls on the telephone from any one or other of the various temples of comfort that he happens to be in at the moment, asking the office about "Gorgonda's Defs" or somebody else's "Prefs," but, taking it all round, West does not get overworked. He says he lives by anticipation. Some of us have tried the dietary and found it more disagreeable, and even less sustaining, than vegetarianism.

When your friend comes to see you, you should offer him your best chair, says honoured old hospitality. When West comes to see me, I faithfully conform to the adage, for I anticipate that he will talk anticipation, also that he will stay long enough to need a soft seat.

West thinks anticipation the golden rule of life, and perhaps he is not so far out as applied to many things, could they always be as we would wish, but unfortunately there are cases in which the realisation that follows does not "pan out."

On my way homewards one evening recently, West drew his car to the side and hailed me, following with the invitation to jump in. He was glad to have seen me, he said, and to his club we had to go, where he sent his man home with the car, saying he would get a taxi to the station for his return.

The early hours of the evening were spent as they should be spent, and do not concern this story. The conversation in the lounge afterwards may be interesting.

"You know," he said, "you scientists do not anticipate things." I hastened to assure him that I did not plead guilty to being one of that intellectual class. "No, but you are mixed up with aeroplanes and things," he persisted, "and you aeroplane people did not anticipate the value of the aeroplane for war purposes until war was knocking at your very door. I know you are all right now, and that we are getting all the machines we want, but we ought to have had that sort of thing all ready long before Germany declared war either on us or anybody else. You fellows ought to have looked ahead, to have anticipated what would be likely to occur in the event of war. Surely, if for no other purpose, you might have anticipated that the aeroplane flying above enemy lines would be the most valuable and speedy method of gaining information imaginable. Good Lord, man, if I didn't look further ahead than you fellows I should never earn salt. I have to look months ahead, sometimes years, and I apply that method, or whatever you care to call it, to all my affairs.

"Look at the submarine. The submarine was more or less perfect six or seven years ago. No doubt they have improved them vastly so far as the boats themselves are concerned, but did any of those official chaps anticipate what a menace they could be to ordinary shipping? Had anybody ever tried to work out some plan of dealing with them up to the time they began to sink our ships? Then look at the giant submarine as a commerce carrier. What has been done to develop them along these lines? Suppose we possessed a large fleet of ocean-going, cargo-carrying submarines now. I know it is not at the moment a commercial proposition to carry cargo by such an expensive and slow method, but what power would Germany have of cutting off our more valuable supplies if those supplies could reach these shores undersea?

"Look at the Zeppelin, again. I know we did not build great airships, and I am not going to suggest that we should have done, because I am not in a position to know. It is not my business. But we knew Germany was building them, and surely we might have anticipated that if ever we were at war with her she would use them against us. Yet what did we do in the way of providing ourselves with some weapon of defence—something with which to bring them down? (This is all West speaking. West speaks all the time when we talk.)

"We solved the first submarine menace, and I have no doubt that we shall solve the present one,

even as we found out how to stop the Zepps. from bombarding our towns and villages; but we did not anticipate, apparently, that such things would ever take place, and so we did little or nothing as an antidote. Surely the mere fact that such things as submarines and Zeppelins existed should have been sufficient to have set us about devising some means of combating them. It was just the same with guns and armoured cars and everything else."

But I had got him on armoured cars. "What about the 'Tanks'?" I asked.

"Oh, the 'Tanks.' Well, yes. Of course, that was a grand idea, but we don't look sufficiently ahead, we don't anticipate. Take it from me, my boy, if I conducted my business without looking ahead and anticipating I should be ruined in six months. I always look well ahead. I always anticipate. I always work out in my own mind just what is likely to happen under a given set of circumstances. I may notice a man, a rival of mine in business, putting a lot of money into something or other, something that I cannot touch. Do I sit down and do nothing? Certainly not. I think it all out. I try to see just where he is likely to hit me, to do me some damage, and I prepare in some way to get out a counter—something that, if it will not stop him in his enterprise, will at least make things so that he cannot hurt me. You think it out, my boy. Try it on everything. Try it on your business, your home, all your transactions."

We rose to depart.

"How do you get home, old chap?" he asked. "Sorry I can't run you to the station. I sent the car home."

"That's quite all right," I answered, "I go by Tube. The station is only just round the corner. I can't afford to live in so exclusive a neighbourhood as Chislehurst and dash about in a car, or even a taxi."

By that time we were in the club lobby, and West was telling the hall porter to get him a taxi to take him to the station.

"Sorry, sir," he replied, "there is a thick fog on outside, and there isn't a taxi to be had for love or money. I've been trying for over an hour to get one for another gentleman."

"Well I'm hanged," exclaimed my friend, "I wish I had kept the car now. I never anticipated a night like this. It was such a fine evening."

"Better come home with me," I suggested. "I anticipated fogs when I took my house on a Tube route."

THE ROLL OF HONOUR.

REPORTED by the Admiralty:—

Died of Injuries.

Sub-Lieut. W. H. Legge, R.N.V.R., attd. R.F.C.

Accidentally Killed.

F. 10845 1st Grade Air-Mech. W. H. Hart, R.N.A.S.

Missing.

Flight-Lieut. C. R. Blagrove, R.N.
F 5396 2nd Grade Air-Mech. J. Milne, R.N.A.S.

Previously reported Missing, now reported Prisoners of War.

Sub-Lieut. R. W. Frazier, R.N.V.R.
Flight Sub-Lieut. C. W. Greig, R.N.
Lieut. Lord Torrington, R.N.V.R.

Believed to be Prisoners of War.

Sub-Lieut. W. C. Jameson, R.N.V.R.
Flight-Lieut. C. A. Maitland-Heriot, R.N.

Reported by the War Office:—

Killed.

2nd Lieut. H. J. Davis, Lincoln., attd. R.F.C.
Lieut. R. J. Docking, Buffs (E. Kent), attd. R.F.C.
2nd Lieut. H. L. Pateman, R.F.C.
Lieut. W. A. Porkess, Yeo. and R.F.C.
2nd Lieut. E. Roberts, R.F.C.

Died of Wounds.

Capt. J. C. McMillan, R. Scots Fus., attd. R.F.C.

Previously reported Missing, now reported Killed.

Capt. C. M. Carbert, M.C., Can. Inf., attd. R.F.C.

Previously reported Missing, now reported Died of Wounds as a Prisoner of War in German hands.

2nd Lieut. A. L. M. Shepherd, King's R.R.C., attd. R.F.C.

Previously reported Missing, now Unofficially reported Killed.

Lieut. C. M. Buck, Ind. Army Res. of Officers, attd. R.F.C.

Previously reported Missing, now reported by the German Government Killed or Died of Wounds.

17094 1st Air-Mech. N. L. Brain, R.F.C.

Accidentally Killed.

27466 2nd Air-Mech. L. L. Bailey, R.F.C.
9832 1st Air-Mech. E. R. Dade, R.F.C.

Died.

745 Flight-Sergt. J. Hartnett, R.F.C.

Wounded.

Capt. L. P. Aizlewood, M.C., Yorks. and Lancs. and R.F.C.
2nd Lieut. W. H. K. Copeland, Yeo. and R.F.C.
2nd Lieut. I. S. Edelston, R.F.C.
2nd Lieut. F. I. Fleming, R.F.C.
Lieut. W. B. MacDonald, Can. Inf., attd. R.F.C.
Lieut. A. N. Nesbitt, R.F.C.
2nd Lieut. H. V. Puckridge, Shrops. L.I., attd. R.F.C.
Lieut. J. M. J. C. J. I. Rock, Bedford and R.F.C.
2nd Lieut. A. E. P. Smith, R.F.C.
2nd Lieut. F. W. A. Vickery, Durham L.I., attd. R.F.C.
38292 2nd Air-Mech. J. J. Hutchinson, R.F.C.
9499 2nd Air-Mech. K. C. McDonald, R.F.C.
21353 1st Air-Mech. W. Tattersall, R.F.C.

Previously reported Missing, now reported Wounded and Prisoner of War in German hands.

Lieut. R. W. White, Gen. List, attd. R.F.C.

Missing.

2nd Lieut. E. E. Erlebach, R.F.C.
2nd Lieut. J. T. Gibbon, R.F.C.
2nd Lieut. J. K. Howard, Sherwood F. and R.F.C.
Lieut. T. C. H. Lucas, Suffolk and R.F.C.
Lieut. E. B. Maule, Highland L.I., attd. R.F.C.
Capt. J. Thorburn, R.G.A. and R.F.C.
2nd Lieut. M. E. Woods, R.F.C.

Fatal Accidents.

AN inquest was held at Wilton on February 15th concerning the deaths of 2nd Lieut. G. I. Wilson, Yorks Hussars, attd. R.F.C., and 2nd Lieut. G. S. Brown, Wilts. Regiment, attd. R.F.C. Both officers were flying unaccompanied. Except for the fact that there was a slight haze, the meteorological conditions were favourable for flying. Shortly before the accident the machines were under observation from the ground, but no one actually saw what happened sufficiently clearly to be able to speak with certainty as to the cause. One of the machines fell first, and was so immediately followed by the other that it was generally assumed that they had come into collision. Another pilot who was in the air at the time saw Lieut. Wilson take a turn, and directly afterwards what was thought to be parts of his craft flew off. This witness, however, did not notice the presence of Lieut. Brown's machine at the time. The jury returned a verdict that the "Officers met with their deaths through an accident, due to their machines coming into collision in the air."

An inquest was held at Chesterfield on February 14th on Lieut. Seagrave, who was killed on the 12th inst. An eye-witness said he saw the deceased flying low, and his machine struck a tree and crashed to the ground, being turned completely over. A verdict of "Accidental Death" was returned.

On February 10th Lieut. Legge met with a fatal accident at Solihull. He had started from Rugby, and on nearing Solihull something went wrong with his engine, and the aeroplane fell into a field. Lieut. Legge was removed to hospital, where he died on the following day.

The British Air Service

"PER ARDUA AD ASTRA"

UNDER this heading are published each week the official announcements of appointments and promotions affecting the Royal Naval Air Service and the Royal Flying Corps (Military Wing) and Central Flying School. These notices are not duplicated. By way of instance, when an appointment to the Royal Naval Air Service is announced by the Admiralty it is published forthwith, but subsequently, when it appears in the LONDON GAZETTE, *it is not repeated in this column.*

Royal Naval Air Service.

Admiralty, February 13th.

Flight-Com. C. Draper appointed as Actg. Sqdn. Com., to date Feb. 8th.

J. L. Walshe granted temp. commission as Lieut., R.N.V.R., with seniority Feb. 12th.

The under-mentioned entered as Prob. Flight Officers for temp. service, to date as stated: H. L. Webster, Dec. 15th; G. A. Flavelle, S. W. Rosevear, H. McK. Reid, W. A. Carley, R. B. N. Venning, L. H. L. Lindsay, T. B. Holmes, H. J. Wiser, E. L. H. Macleod and G. H. Boyce, Jan. 19th; C. H. Wein, Nov. 26th; J. R. Wilford, Dec. 30th; E. E. La Berce, Dec. 3rd; J. L. Larigne, Dec. 2nd.

L. H. Vint entered as Warrant Officer, 2nd grade, for temp. service, to date Feb. 19th.

Admiralty, February 16th.

Lieut. (Flight-Com.) R. B. B. Colmore promoted to Lieut.-Com. (Emergency List), with seniority Feb. 15th.

R. C. Tyler entered as Prob. Flight Officer, for temp. service, to date Dec. 19th.

Admiralty, February 17th.

The following entered as Prob. Flight Officers (Temp.) and appointed to the "President," additional, for R.N.A.S.: T. Richardson, A. A. Bishop, J. E. Greene, J. A. Mundell, J. E. C. Howard, W. C. Jeffries, R. E. McMillan, N. G. Fraser, H. J. Connolly, B. W. Broatch, G. N. Shea, G. L. Trapp, E. V. J. Grace, A. J. Dixon, C. J. Poulin, H. A. Urquhart, H. A. Yates, K. V. Turney, H. H. S. Fowler. C. W. L. Calvert, J. McClinton, M. S. Taylor, A. Woods, C. G. Davis, R. C. Whitfield, M. V. Kelly, L. Rosenbaum, W. S. Barry, L. J. Dunham, R. H. Barkley, D. E. M. Grier and L. J. Stanyon.

H. Girdlestone granted a temp. commission as Sub-Lieut., R.N.V.R., and appointed to the "President," additional, for R.N.A.S., to date Feb. 16th.

Admiralty, February 19th.

The under-mentioned granted temp. commissions as Lieut., R.N.V.R., with seniority as stated: 1st Grade Air-Mech. A. W. Sarsons and L. W. Carr, Feb. 16th; T. J. Offer, W. Burkinshaw, A. Farquhar, S. Strong-Brownhill and J. C. Rennie, Feb. 17th.

O. F. McGregor entered as Prob. Flight Officer (Temp.), to date Dec. 20th.

Royal Flying Corps (Military Wing).

London Gazette Supplement, February 14th.

Squadron Commander.—Temp. Capt. R. Chadwick, M.C., Gen. List, from a Flight-Com., and to be Temp. Major whilst so employed; Feb. 1st.

Flight-Commanders.—From Flying Officers: 2nd Lieut. H. M. Massey, Notts. and Derby. R., and to be Temp. Capt. whilst so employed; Dec. 30th. Capt. A. G. R. Garrod, M.C., Leic. R., S.R.; Jan. 26th.

Flying Officers.—Temp. Lieut. P. J. V. Lavarack, Gen. List; Nov. 5th. Temp. 2nd Lieut. E. B. Low, Gen. List; Jan. 18th. Lieut. W. W. Stratton, Can. A.S.C.; Jan. 22nd. Jan. 23rd: Lieut. G. S. O'Brien, Can. Divl. Cyclist Cos.; Temp. 2nd Lieut. W. Anderson, M.C., Camn. Highrs., and to be transfd. to Gen. List; 2nd Lieut. G. H. Harrison, Middx. R. (T.F.); Temp. 2nd Lieut. (on prob.) R. M. Swyer, Gen. List; Jan. 24th. Jan. 25th: 2nd Lieut. H. M. Coombs, R.F.A. (T.F.); Temp. 2nd Lieut. J. Lawson, Gen. List; Temp. 2nd Lieut. E. J. Smart, Gen. List; 2nd Lieut. A. G. Robertson, R. Highrs., and to be secd.; Capt. A. G. R. Garrod, M.C., Leic. R., S.R., but with seniority from Nov. 22nd, 1915. Jan. 26th: 2nd Lieut. (on prob.) S. Roehe, S.R.; 2nd Lieut. L. C. B. Sheppard, Som. L.I., S.R., and to be secd. Jan. 27th: 2nd Lieut. R. J. Macpherson, Dorset R., and to be secd.; Temp. 2nd Lieut. F. J. Martel, Gen. List.

Equipment Officer, 3rd Class.—Temp. Capt. S. J. Malcolm, attd. Arg. and Suthd. Highrs., and to be transfd. to Gen. List; Jan. 25th.

Memorandum.—Sub-Lieut. D. M. F. Sinclair, from R.N.V.R., to be Temp. Lieut., Gen. List, for duty with R.F.C.; Feb. 18th.

London Gazette Supplement, February 15th.

Flying Officers.—Lieut. R I. Van der Byl, Can. Gen. List; Jan. 17th. Temp. Lieut. D. M. F. Sinclair, Gen. List; Jan. 18th. 2nd Lieut. (Temp. Lieut.) J. L. Blackwood, Lond. R. (T.F.); Jan. 23rd. Jan. 26th: Temp. Lieut. W. R. B. Annesley, R.E. (T.F.), from a Flying Officer (Obs.), with seniority from Oct. 21st, 1915; Temp. 2nd Lieut. W. Bagnall, attd. Sco. Rif., and to be transfd. to Gen. List; Temp. 2nd Lieut. (on prob.) F. D. Holm, R.E.; Temp. 2nd Lieut. R. H. S. Hunter, Gen. List; 2nd Lieut. (on prob.) C. A. Brown, S.R.

Flying Officers (Observers).—2nd Lieut. E. J. D. Townesend, R.A., and to be secd.; Nov. 15th, but with seniority from Jan. 16th, 1916. Temp. Lieut. W. T. Breach, A.S.C., and to be transfd. to Gen. List; Aug. 24th, but with seniority from July 29th, 1916. Temp. Lieut. J. B. Hall, A.S.C., and to be transfd. to Gen. List; Jan. 17th, but with seniority from Aug. 26th, 1916. 2nd Lieut. L. D. Fawcett, Australian Imperial Force; Dec. 26th, but with seniority from Sept. 25th, 1916. 2nd Lieut. (Temp. Capt.) R. H. Rusby, Glouc. R. (T.F.); Jan. 21st, but with seniority from Sept. 29th, 1916. Temp. 2nd Lieut. J. Mitchie, Gen. List; Jan. 20th, but with seniority from Sept. 30th, 1916. Temp. 2nd Lieut. R. V. Nalder, attd. Middx. R., and to be transfd. to Gen. List; Dec. 26th, but with seniority from Oct. 3rd, 1916. Temp. 2nd Lieut. (on prob.) G. H. Glendenning, Gen. List; Jan. 26th, but with seniority from Oct. 4th, 1916. Lieut. G. N. Mills, Australian Imperial Force; Dec. 26th, but with seniority from Oct. 6th, 1916. Temp. 2nd Lieut. A. Baillie, R. Highrs., and to be transfd. to Gen. List; Jan. 17th, but with seniority from Oct. 6th, 1916. Temp. Lieut. W. F. Hellyar, A.S.C., and to be transferred to Gen. List; Jan. 20th, but with seniority from Oct. 8th, 1916. Temp. 2nd Lieut. L. C. Welford, Gen. List; Jan. 22nd, but with seniority from Oct. 11th, 1916. Temp. 2nd Lieut. G. L. Graham, attd. Hrs., and to be transfd. to Gen. List; Jan. 21st, but with seniority from Oct. 13th, 1916. Temp. 2nd Lieut. (on prob.) C. S. Emery, Gen. List; Jan. 20th, but with seniority from Oct. 15th, 1916. Jan. 17th, but with seniority from Oct. 15th, 1916: Temp. 2nd Lieut. (on prob.) F. H. Austin, Gen. List; Temp. 2nd Lieut. (on prob.) D. E. Greenhow, Gen. List. Temp. 2nd Lieut. (on prob.) J. A. Vessey, Gen. List; Jan. 27th, but with seniority from Oct. 15th, 1916. 2nd Lieut. J. M. Sim, Gord. Highrs. (T.F.); Jan. 21st, but with seniority from Oct. 16th, 1916. Temp. 2nd Lieut. (on prob,) F. G. Brockman, Gen. List; Jan. 18th, but with seniority from Oct. 16th, 1916. Temp. 2nd Lieut. H. A. Chuter, R. Fus.; Jan. 21st, but with seniority from Oct. 17th, 1916. Jan. 19th, but with seniority from Oct. 21st, 1916: 2nd Lieut. N. Macgregor, Arg. and Suthd. Highrs. (T.F.); Temp. 2nd Lieut. (on prob.) R. Ritchie, Gen. List. Lieut. R. M. Smith, Australian Light Horse; Dec. 26th, but with seniority from Oct. 24th, 1916. Jan. 20th, but with seniority from Oct. 26th, 1916: Lieut. M. Moore, York. and Lanc. R., and to be secd.; 2nd Lieut. F. G. Truscott, M.C., Suff. R. (T.F.), from Temp. Lieut., Lond. Divl. Cyclist Cos., Divl. Mtd. Troops (T.F.). Temp. 2nd Lieut. J. Senior, W. York. R., and to be transfd. to Gen. List; Jan. 28th, but with seniority from Oct. 26th, 1916. 2nd Lieut. T. F. Northcote, King Edward's Horse, S.R., and to be secd.; Jan. 24th, but with seniority from Oct. 26th, 1916. Temp. 2nd Lieut. (on prob.) L. G. Banks, Gen. List; Jan. 18th, but with seniority from Oct. 26th, 1916. Lieut. M. R. D'Arcy, Ind. Army Res. of Officers; Jan. 4th, but with seniority from Nov. 3rd, 1916. Temp. 2nd Lieut. (on prob.) A. H. Steele, Gen. List; Jan. 24th, but with seniority from Nov. 4th, 1916. Temp. 2nd Lieut. (on prob.) H. B. Griffiths, Gen. List; Jan. 22nd, but with seniority from Nov. 8th, 1916. 2nd Lieut. (Temp. Lieut.) B. Balfour, Lond. R. (T.F.); Jan. 21st, but with seniority from Nov. 11th, 1916. Jan. 20th, but with seniority from Nov. 14th, 1916: Temp. Lieut. E. G. Green, R.E.; Temp. 2nd Lieut. (on prob.) G. R. F. Waner, R.E. 2nd Lieut. C. P. Tiptaft, M.C., Conn. Rang., S.R., from Temp. Lieut., R. Ir. Rif., and to be secd.; Jan. 17th, but with seniority from Nov. 15th, 1916. Temp. 2nd Lieut. (on prob.) C. J. Baylis, Gen. List; Jan. 21st, but with seniority from Nov. 15th, 1916. 2nd Lieut. W. J. Lidsey, Oxf. and Bucks L.I. (T.F.); Jan. 24th, but with seniority from Nov. 25th, 1916. Temp. 2nd Lieut. R. S. Rudd, Devon R., and to be transfd. to Gen. List; Jan. 21st, but with seniority from Nov. 27th, 1916. Jan. 20th, but with seniority from Dec. 16th, 1916: Lieut. G. M. A. Hobert-

Hampden, Oxf. and Bucks. L.I. (T.F.); Temp. 2nd Lieut. A. G. Severs, attd. Middx. A., and to be transferred to Gen. List.

Equipment Officers, 2nd Class.—Lieut. L. A. McDougald, S.R., from the 3rd Cl.; Jan. 29th.

3rd Class.—2nd Lieut. (on prob.) H. J. Birtles, S.R.; Jan. 12th.

London Gazette, February 16th.

Flying Officers (Observers).—Jan. 31st: 2nd Lieut. (Temp. Lieut.) J. D. S. Denholm, Arg. and Suthd. Highrs. (T.F.), but with seniority from Aug. 29th, 1916; Temp. 2nd Lieut. W. B. Long, Oxf. and Bucks. L.I., with seniority from Sept. 1st, 1916, and to be transfd. to Gen. List. Temp. 2nd Lieut. (on prob.) H. R. Hare, Gen. List; Jan. 29th, but with seniority from Oct. 5th, 1916. Temp. Lieut. A. R. Brassington, Leins. R.; Jan. 31st, but with seniority from Oct. 15th, 1916. Temp. 2nd Lieut. (on prob.) A. M. Turnbull, Gen. List; Jan. 29th, but with seniority from Nov. 10th, 1916. Jan. 19th: Temp. Lieut. D. Kingsley, Seaf. Highrs., but with seniority from Nov. 25th, 1916; 2nd Lieut. R. S. B. Beckett, Ind. Inf., but with seniority from Nov. 30th, 1916.

Park Commander.—Temp. Capt. E. A. Goodwin, Gen. List, from an Equipment Officer, 1st Cl., and to be Temp. Major whilst so employed; Jan. 1st.

Equipment Officers, 1st Class.—From the 2nd Cl.: Temp. Capt. L. Sadler, A.S.C.; Jan. 1st. 2nd Lieut. (Temp. Lieut.) E. Stokes, S.R., and to be Temp. Capt. whilst so employed; Jan. 25th.

3rd Class.—Temp. Lieut. R. W. Smart, attd. Notts. and Derby R., and to be transfd. to Gen. List; Oct. 23rd.

Memorandum.—A. A. M. Weir to be Temp. 2nd Lieut. (on prob.) for duty with R.F.C.; Jan. 23rd.

London Gazette Supplement, February 17th.

The under-mentioned to be Temp. 2nd Lieuts.:—

For duty with R.F.C.—Jan. 25th: Qmr.-Sergt. P. M. Brambleby, from King Edward's Horse; L.-Corpl. N. Couve, rom King Edward's Horse.

Flight-Commanders.—From Flying Officers, and to be Temp. Capts. whilst so employed: 2nd Lieut. J. L. Horridge, S.R.; Jan. 8th. 2nd Lieut. R. W. Heath, S.R.; Jan. 18th. Jan. 19th: Temp. 2nd Lieut. A. W. Bird, Gen. List; 2nd Lieut. S. W. Dunckley, S.R. 2nd Lieut. W. R. Snow, S.R.; Jan. 22nd. 2nd Lieut. E. D. Atkinson, Ind. Army Res. of Officers; Jan. 25th. 2nd Lieut. E. J. Henderson, S.R.; Feb. 5th. Feb. 7th: 2nd Lieut. (Temp. Lieut.) F. Fernihough, R.F.A. (T.F.); 2nd Lieut. J. W. James, S.R.

Flying Officers (Observers).—Temp. Lieut. A. P. Ravenscroft, R.A., and to be transfd. to Gen. List; April 5th, 1916. 2nd Lieut. (Temp. Capt.) W. Benn, Yeo. (T.F.); May 12th, 1916. Jan. 31st: Temp. 2nd Lieut. R. E. Thomas, S. Wales Bord., but with seniority from Sept. 26th, 1916; Temp. 2nd Lieut. E. H. N. Stroud, attd. Leic. R., but with seniority from Sept. 27th, 1916. Temp. 2nd Lieut. C. C. G. Girvan, Lan. Fus.; Feb. 1st, but with seniority from Oct. 3rd, 1916. Feb. 2nd, but with seniority from Oct. 4th, 1916; 2nd Lieut. H. I. Newton, Notts. and Derby. R. (T.F.); Temp. 2nd Lieut. (on prob.) G. Maddock, Gen. List. 2nd Lieut. (Temp. Lieut.) J. R. Samuel, Welsh R. (T.F.); Jan. 31st, but with seniority from Oct. 14th, 1916. Temp. Lieut. J. Brooker, Welsh R. and to be transfd. to Gen. List; Feb. 2nd, but with seniority from Oct. 23rd, 1916. Jan. 31st: Temp. 2nd Lieut. (on prob.) K. R. Napier, Gen, List, but with seniority from Nov. 1st, 1916; Temp. Lieut. E. Thornton, Gen. List, but with seniority from Nov. 7th, 1916. 2nd Lieut. (Temp. Lieut.) R. Rutherford, Mon. R. (T.F.); Feb. 2nd, but with seniority from Nov. 9th, 1916. 2nd Lieut. F. Cade, Worc. R. (T.F.); Jan. 31st, but with seniority from Nov. 10th, 1916. Feb. 2nd, but with seniority from Nov. 11th, 1916: 2nd Lieut. (Temp. Lieut.) H. F. Duncan, High. L.I. (T.F.); 2nd Lieut. E. Harling, N. Lan. R. (T.F.). Temp. 2nd Lieut. (on prob.) A. Matthews, Gen. List; Jan. 31st, but with seniority from Nov. 18th, 1916. Paymr. and Hon. Capt. G. C. Easton, Can. Inf., and to be Temp. Capt. whilst so employed, from Nov. 25th, 1916; Feb. 2nd, but with seniority from Nov. 25th, 1916.

Balloon Company Commanders.—Graded as a Squadron Commander: Capt. D. Rainsford-Hannay, Ind. Inf., from a Flight-Com., and to be Temp. Major whilst so employed, and to retain his present appointment as Com. of a Balloon School of Instruction; Dec. 5th, 1916. Graded as Flight Coms.: Temp. 2nd Lieut. W. S. Huxley, Gen. List, from a Balloon Officer, and to be Temp. Capt. whilst so employed; Jan. 13th. (Substituted for the notification in the *Gazette* of Jan. 30th.) The appointment of 2nd Lieut. (Temp. Capt.) W. Wallace, R.F.A. (T.F.), notified in the *Gazette* of Jan. 20th is antedated to Sept. 8th.

Balloon Officers.—2nd Lieut. L. L. Falck, Middx. R. (T.F.); Dec. 19th. Capt. W. S. Ford, E. Surr. R., S.R., from a Rail. Trans. Officer, and to remain secd.; Jan. 2nd. Temp. 2nd Lieut. N. J. Rich, R.E.; Jan. 28th. Temp. 2nd Lieut. W. V. Radford, Gen. List; Jan. 31st.

Equipment Officers, 2nd Class.—Temp. 2nd Lieut. J. M. Mitchell, Gen. List, from the 3rd Cl., and to be Temp. Lieut. whilst so employed; Jan. 25th.

3rd Class.—Capt. E. S. Skipper, S.R., from a Staff-Lieut.; Nov. 7th, 1916, but with seniority from June 12th, 1915.

Memoranda.—Sergt. D. A. Neville, from R.F.C., to be Temp. 2nd Lieut., for duty with the Mil. Wing of that Corps; Feb. 7th. G. H. Ellis to be Temp. 2nd Lieut. (on prob.) for duty with R.F.C.; Feb. 16th. C. Hines to be Temp. Hon. 2nd Lieut. whilst employed with R.F.C.; Feb. 18th.

Supplementary to Regular Corps.—The under-mentioned 2nd Lieuts. (on prob.) are confirmed in their rank: C. A. Brown, A. O. Roberts, H. C. Perks, S. Roche, J. H. F. Pilling, J. C. Murray, J. H. Cotton, C. R. Duggan, E. S. Crabtree, D. E. Barnett, F. W. Elstub, H. G. Day, F. M. Harding. G. W. M. Whitton to be 2nd Lieut.; Dec. 9th. The under-mentioned to be 2nd Lieuts. (on prob.): B. C. Adamson; Jan. 3rd. R. Waddell; Jan. 18th.

London Gazette Supplement, February 19th.

Squadron Commanders.—Lieut. (Temp. Capt.) J. P. C. Sewell, S.R., from a Flight-Com., and to be Temp. Major whilst so employed; Feb. 5th.

Flight-Commanders.—From Flying Officers, and to be Temp. Capts. whilst so employed: Temp. 2nd Lieut. (Temp. Lieut.) G. W. M. Green, Gen. List; Nov. 22nd. Lieut. G. D. Gardner, York. R. (T.F.); Dec. 11th. Temp. Capt. H. G. Kaye, Gen. List, from a Flying Officer; Jan. 1st. From Flying Officers, and to be Temp. Capts. whilst so employed: Temp. 2nd Lieut. (Temp. Lieut.) R. P. Willock, Gen. List; Jan. 26th. 2nd Lieut. A. N. Benge, S.R.; Feb. 1st. 2nd Lieut. W. H. K. Copeland, Yeo. (T.F.); Feb. 3rd.

Balloon Officers.—Temp. Capt. E. L. Chute, W. Rid. R., and to be transfd. to Gen. List; Jan. 17th. Jan. 31st: 2nd Lieut. (Temp. Lieut.) W. R. Phillips, Lond. R. (T.F.); Temp. 2nd Lieut. C. Hope, attd. Suff. R., and to be transfd. to Gen. List; Temp. 2nd Lieut. F. Planche-Hearn, R. Berks. R., and to be transfd. to Gen. List; Temp. 2nd Lieut. P. King, attd. E. Surr. R., and to be transfd. to Gen. List; Temp. 2nd Lieut. (on prob.) H. F. N. Paull, Gen. List.

Equipment Officers, 2nd Class.—From the 3rd Cl., and to be Temp. Capts. whilst employed with detached wings of the R.F.C.: Lieut. M. Hodge, S.R.; Sept. 26th. Lieut. O. I. Preston, Notts. and Derby. R. (T.F.); Sept. 26th. Lieut. C. H. Awcock, R.A.; Oct. 11th.

Royal Flying Corps (Territorial Force).

London Gazette, February 13th.

Capt. F. M. Green to be Temp. Major; Dec. 12th.

"Getting Her Height."

THE first edition of the reprints of the very effective picture by Capt. Roderic Hill, "Getting Her Height," which was included in "FLIGHT" for January 4th, having been exhausted, it has been reprinted, this time in sepia, and copies can be had from "FLIGHT" offices for 1s. 6d. post free.

Echo of Essex Zeppelin Raid.

MR. JOHN WRIGHT, an Essex farmer, whose son, Alfred Wright, recently died from injuries received through collision with a motor car whilst riding to the nearest military station with information of the descent of a German airship in September last, has been granted by the War Office the sum of £150 as some compensation and in recognition of the young man's brave action. Alfred Wright was a cripple, and the mainstay of the farm.

Further Honours for Captain Ball.

ON Monday last the freedom of the City of Nottingham was conferred on Capt. Albert Ball, D.S.O., M.C., R.F.C., son of a former Mayor of the City, in recognition of his brilliant work as a flying officer in the war. It was announced last week that Capt. Ball, whose work at the front has won for him the D.S.O., with two bars, and the Military Cross, had been decorated with the order of St. George by H.I.M. the Czar of Russia.

THE AEROPLANE OF TO-MORROW.

By LOUIS DE BAZILLAC, Engineer (École Supérieure d'Aéronautique de Paris).

Translated by B. BRUCE-WALKER, B.Sc.

(*Continued from page* 889, Vol. VIII.)

APPENDIX I.

Practical incompatibility of the expression $\tan\gamma = \frac{Rx}{Ry}$ *and the formula* $\tan\gamma = ra + i + \frac{s}{a}$.—*Practical necessity of writing:* $s = \sigma + ra_1^2$—*Advantages of the new formula—Application to ascending flight in the case of variable surface—Consequences.*

When an aeroplane descends with the engine off, and in still air, it tends, as we know, to take a certain speed and a rectilinear trajectory that depend on the angle of attack that is given to it by the relative position of the different surfaces composing it.

Let :—

W be the weight of the machine ;

Rx and Ry the coefficients of drift and of total pressure determined experimentally with a small model of the aeroplane, $1/n$th scale, for different angles of attack a, measured to the imaginary plane (a plane lying in line with the wind when pressure is zero) ;

F the sustaining force normal to the trajectory of slope γ, and R the total resistance to forward motion.

We know that if the normal uniform speed V is reached, the forces present are in equilibrium, and we have :—

$$F = W\cos\gamma = Ry\,n^2V^2$$
$$R = W\sin\gamma = Rx\,n^2V^2$$

from which we obtain :—

$$\tan\gamma = \frac{Rx}{Ry} = f(a) \qquad (A)$$

Now, $\frac{Rx}{Ry} = f(a)$ is represented by Eiffel's experimental curves (Fig. 1), consequently these curves give the value of the angle of descent as a function of the angle of attack.

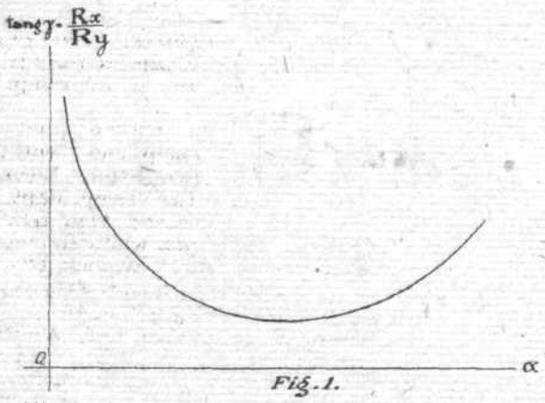


Fig. 1.

As these curves all have the same form—a hyperbola—it has been attempted to represent them analytically in a first approximation by the following expression :—

$$\tan\gamma = ra + i + \frac{s}{a} \qquad (B_1)$$

a being the angle of attack measured to the imaginary plane ;

r a coefficient smaller than 1 for a cambered surface ;

i a coefficient generally negative, zero for a flat surface and for an infinite surface, and s a coefficient relating to the body and the wings.

Also it is admitted that the components of the resistance of the air can be represented in a first approximation and for small angles by the following formulæ :—

$$Rx = KSV^2(ra^2 + ta + s).$$
$$Ry = KSV^2a. \qquad (C_1)$$

S being the total wing surface and K a coefficient sensibly constant.

Although these formulæ certainly do not apply very well to curved surfaces, they are applied to the aeroplane as a whole, and it is from them that have arisen the theories of the various principles of the aeroplane. It is true that the study of the principles of the aeroplane, from the dynamical point of view at any rate, rests above all on an all-round agreement with facts ; and it can be proved that the hyperbolic form which represents the formula (B_1) is general and independent of the approximation admitted for the laws of the resistance of the air.

But this formula should not be incorrect in any case ; yet, in the particular limiting case of S infinite, it is not in accord with the hyperbola found from experience.

We will study this limiting case. This will lead us to modify the construction of equation (B_1), and substitute a new formula for it.

System (B_1) *is practically incompatible with System* (A).

Consider for a moment equation (A). This equation can be written :—

$$\text{Tan}\,\gamma = \frac{Rx}{Ry} = \frac{Kx + \frac{\lambda}{S}}{Ky} = \frac{Kx + \frac{\lambda_0 + K_1S_1}{S}}{Ky}$$

Kx and Ky being the coefficients of drift and lift for unit area of the whole of the wing surface ;

S the total area of the wings ;

λ the coefficient of total extra head resistance ;

λ_0 the coefficient of extra head resistance of the body, K_1S_1 that of the wings ;

K_1 the coefficient of resistance of a normal plane, and S_1 the equivalent detrimental surface.

Suppose that the coefficient λ can become infinitely small, or the area S infinitely great ; the term $\frac{\lambda}{S}$ tends to become zero, for K_1S_1 increases less rapidly than S, and $\frac{Rx}{Ry}$ tends to become $\frac{Kx}{Ky}$. Now $\frac{Kx}{Ky}$ is shown experimentally to be a function of a according to a curve (Fig. 2), which is that of the total wing surface taken separately. The curve

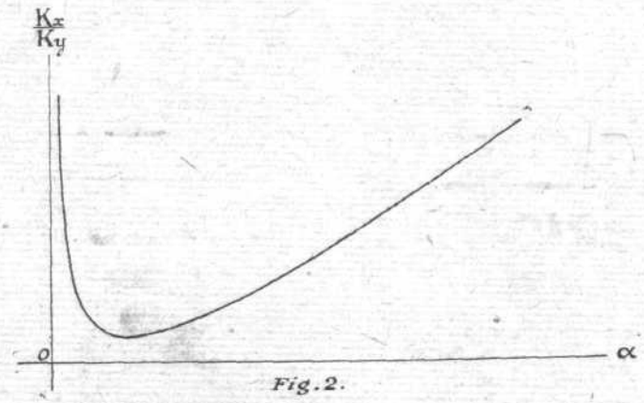


Fig. 2.

of inclinations (1) relating to the aeroplane tends as a consequence towards the curve (2) relating to the wings ; and as the minimum of the first corresponds to the best angle of the aeroplane a_0, and the minimum of the second to the best angle of the wings a_1, the best angle of the aeroplane tends to become the best angle of the wings, a_0 and a_1 tending to coincide.

Now Kx can, in practice, with a cambered wing section never become zero ; so $\frac{Kx}{Ky}$ cannot vanish, and as $Ky=0$ when $a = 0$, $\frac{Kx}{Ky}$ is infinitely great when a is nothing. This is what is borne out by experience. Curve (2) has, in fact, the form of a hyperbola, of which one of the asymptotes is the axis of y. a_1 does not vanish. For $a=a_1$, $\tan\gamma$ has therefore a finite positive value.

What, now, does equation (B_1) give us ?

$$\text{Putting } s = \frac{\lambda}{KS},$$

equation (B_1) may be written

$$\tan\gamma = ra + i + \frac{\lambda}{KSa};$$

$$\text{and } a_0^2 = \frac{\lambda}{rKS}.$$

When λ tends to become zero or S infinite, a_0 tends to be zero, and $\tan\gamma$ is represented by a point, of which the ordinate at the origin is i.

a_1 is always theoretically nothing. For $a = a_1 = 0$, $\tan\gamma$ can thus take all values from i to infinity.

Such a systematic expression of the value of a_1 is incompatible with the usual data furnished by experience.

The result is that the equations (A) and (B_1) are prac-

tically incompatible for λ zero and for S infinite, and that (A) negatives (B_1).

Equation (B_1) Modified—The Formula proposed—Its Advantages.

What must be done for system (B_1) to remain in its form and general character the accurate expression of the problem ?

Tan γ must be a function of α_1, so that for $S = \infty$ or $\lambda = 0$, $\alpha_0 = \alpha_1$; we must have, in fact, if σ is a coefficient relating to the body and the wings :—

$$\frac{\sigma}{r} = \frac{\lambda}{rKS} = \alpha_0^2 - \alpha_1^2$$

$$\text{and } \tan\gamma = r\alpha + t + \frac{\sigma + r\alpha_1^2}{\alpha}; \qquad (B_2)$$

which gives, for $S = \infty$:—

$$\alpha_0 = \alpha_1;$$

$$\text{and } \tan\gamma = t + 2r\alpha_0 = t + 2r\alpha_1.$$

Formulæ (C_1), generally accepted, then become :—

$$Rx = KSV^2[r\alpha^2 + t\alpha + (\sigma + r\alpha_1^2)]$$

$$Ry = KSV^2\alpha$$

so that (B_1) and (B_2), (C_1) and (C_2) are identical, provided we write :—

$$s = \sigma + r\alpha_1^2.$$

This interpretation of the value of s is more rational and more general, since it contains the case of α_1 not being zero, and since for α_1 zero $s = \sigma$.

It allows us to consider now analytically as well as according to the data furnished by experience, an angle α_1, the best angle of the wings, not necessarily zero, which it is possible to adopt for the normal angle without being led to give an infinite value to the tractive force.

Application.

Before stating the consequent effects on the theory of the aeroplane brought about by the modification

$$s = \sigma + r\alpha_1^2$$

a direct application of the formulæ (C_2) will be given.

Suppose it is required to calculate for an aeroplane of variable surface in which the normal angle is the best angle of the wings :—

(1) The minimum surface necessary for sustentation with a tractive force H ;

(2) The surface giving the maximum vertical speed when climbing at the angle corresponding to this speed.

Let :—

G be the centre of gravity of the machine,

W its weight, assumed constant,

V the speed,

i the angle of this velocity with the horizontal,

and H the tractive force of the propeller, assumed constant and directed parallel to the velocity of the machine.

If we resolve the forces acting on the machine first along the direction of the velocity and then perpendicular to it (see Fig. 1 of the article of September 4th, 1914), we can write in a first approximation :—

$$H - W\sin i = KSV^2(r\alpha^2 + t\alpha + \sigma + r\alpha_1^2);$$

$$W\cos i = KSV^2\alpha;$$

Whence dividing one equation by the other and taking for small angles the tangent equal to the angle and the cosine as unity :—

$$\frac{H}{W} - i = \theta - i = r\alpha + t + \frac{\sigma + r\alpha_1^2}{\alpha};$$

and the vertical component N of the velocity gives :—

$$N = V\sin i = Vi = \sqrt{\frac{W}{KS\alpha}}\left[\theta - r\alpha - t - \left(\frac{\sigma + r\alpha_1^2}{\alpha}\right)\right] \qquad (1)$$

In looking for the maximum of N it will be found that it takes place at a value α_M of the angle of attack defined by the equation :—

$$r\alpha_M^2 + (\theta - t)\alpha_M - 3(\sigma + r\alpha_1^2) = 0 \qquad (2)$$

of which only the positive root need be considered.

Equation (2) gives for α_M the value :—

$$\alpha_M = \frac{1}{2r}\left[-(\theta - t) + \sqrt{(\theta - t)^2 + 12r\left(\frac{\lambda}{KS} + r\alpha_1^2\right)}\right] \qquad (3)$$

It is evident that α_M is always higher than α_1.

We will now see that α_M is always lower than α_0. For this we will change equation (2) slightly. Notice first of all that for $\alpha = \alpha_1$, N = 0 ; and equation (1) gives :—

$$\theta = 2r\alpha_1 + t + \frac{\sigma}{\alpha_1}; \qquad (4)$$

for $\alpha = \alpha_0$, θ is a minimum, its derivative vanishes and :—

$$\frac{\sigma}{r} = \alpha_0^2 - \alpha_1^2 \qquad (5)$$

Substituting these values in (2) it becomes :—

$$\alpha_M^2 + \left(\alpha_1 + \frac{\alpha_0^2}{\alpha_1}\right)\alpha_M - 3\alpha_1^2 = 0 \qquad (6)$$

It is easy to see that the value of α_M that satisfies this equation is lower than α_0. For the values of α_M equal to α_1 and α_0, the polynomial (3) passes, in fact, from negative to positive. The positive value of α_M that makes the polynomial zero is therefore necessarily placed between α_1 and α_0. Consequently :—

$$\alpha_1 < \alpha_M < \alpha_0.$$

For $S = \infty$ the relations (3), (4) and (5) show us that

$$\alpha_0 = \alpha_M = \alpha_1.$$

These results are in every respect in accord with those furnished by the experimental formula :—

$$\tan\gamma = \frac{Rx}{Ry} = \frac{Kx + \frac{\lambda}{S}}{Ky}$$

in which, for S infinite, α_0 is equal to α_1 and $\tan\gamma$ to the value of the ordinate correspondiing to the minimum of $\frac{Kx}{Ky}$. Formula (B_1) would have given $\theta = \infty$ with :—

$$\alpha_0 = \alpha_M = 0.$$

The maximum value of N—which we will denote by N_M—can easily with the aid of equation (2) be put in the form (article of September 11th, 1914) :—

$$N_M = \frac{2}{3}\sqrt{\frac{W}{KS}}\left[\frac{\theta - t}{\sqrt{\alpha_M}} - 2r\sqrt{\alpha_M}\right]$$

so long as the value of N corresponding to α_0 is expressed by :—

$$N_0 = \sqrt{\frac{W}{KS}}\left[\frac{\theta - t}{\sqrt{\alpha_0}} - 2r\sqrt{\alpha_0}\right]$$

and the value of N_1 corresponding to α_1 by :—

$$N_1 = \sqrt{\frac{W}{KS\alpha_1}}\left[\theta - t - 2r\alpha_1 - \frac{\sigma}{\alpha_1}\right]$$

By studying the variations of N_M, N_0 and N_1 as functions

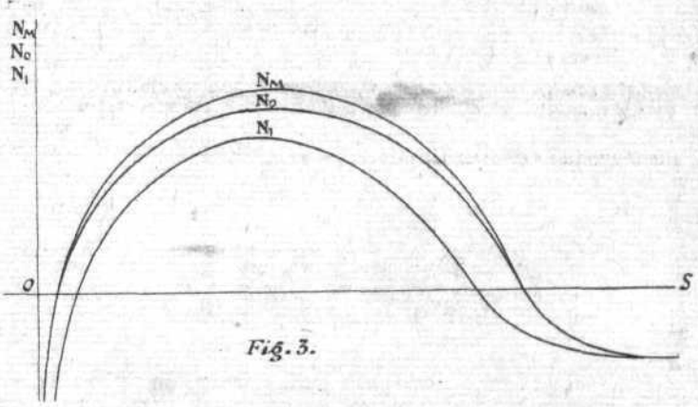


Fig. 3.

of S and taking their derivatives, we would obtain the curves given in Fig. 5 in the article in "FLIGHT" of September 11th, 1914.

These curves all pass through a maximum and have zero values for $S = \infty$.

N_0 and N_M vanish for :—

$$S = \frac{4r\lambda}{K[(\theta - t)^2 - 4r^2\alpha_1^2]}$$

The speed N_1 vanishes for :—

$$S = \frac{\lambda}{K\alpha_1[(\theta - t) - 2r\alpha_1]}.$$

It will be seen that for $\theta = \frac{H}{W} = \infty$ these curves all start from the origin of the axes. For $\theta - t = 2r\alpha_1$ each of the maxima lies at a point of zero ordinate for $S = \infty$. For no surface area an aeroplane then needs an infinite tractive force or no weight to sustain itself in a horizontal path. With an infinite surface area it suffices to have a tractive force $H = W(t + 2r\alpha_1)$.

Formula (B_1) has led us to say : "With an infinite surface a tractive force $H = Wt$ is needed," which is not a general truth, but is only true in the particular limiting case of $\alpha_1 = 0$.

Consequences of the Modification brought about by System (C_2) in System (C_1).

Of the modification brought by system (C_2) into system (C_1) by means of the expression :—

$$s = \sigma + r\alpha_1^2$$

the following consequences make themselves clear :—

(1) The minimum of the tractive force takes place when the resistance of sustentation is equal to the resistance of penetration (head resistance of wings and body), increased by the resistance of sustentation corresponding to the best angle of the wings.

(2) The minimum of the power takes place when the resistance of sustentation is equal to three times the resistance of penetration (head resistance of wings and body) increased by three times the resistance of sustentation corresponding to the best angle of the wings.

To sum up, the formulæ (C_1) suffice for the rational discussion of the problem of the conditions of flight in the case of the aeroplane with non-variable surface, but they would not suit for the same study in the case of the aeroplane with alterable wings which is the preoccupation of the present and will be the reality of the future.

Casualties.

Captain CHARLES MOLYNEAUX CARBERT, Canadian Infantry, attached R.F.C., previously reported missing, now reported killed, was awarded the Military Cross, the official account of the award stating that "he led his men in the attack with great gallantry. Later he assumed command of his company, displaying great courage and determination. He materially assisted in the success of the operation." The award was gazetted in November of last year.

Lieutenant HORACE J. DAVIS, who has been killed while flying at the Front, was 23, and was on the staff of the Capital and Counties Bank. He joined the Forces early in the war, and after going through the O.T.C., was gazetted to the Lincolnshire Regiment. He saw much active service, and was afterwards transferred to the R.F.C. At the time of his death he was engaged in photographing and locating enemy posts. His pilot, M. Patman, was also killed. Lieutenant Davis, who was a native of Kent, was married to a daughter of the manager of Messrs. Barclay's Bank at Spilsby.

Second Lieutenant STEPHEN DENDRINO, R.F.C., who was reported missing after an air fight on September 28th last, is now reported as having been killed. The fact has also now been established that he was the aviator mentioned by Boelcke, the German flyer, in his recently published logbook, as having been killed by him in an air fight on September 28th, but whose machine nevertheless continued to fly round in even circles owing to the controls having been fastened in position by rubber bands. This was recently referred to in "FLIGHT," and it will be remembered that Boelcke's logbook quoted the number of the British aviator's machine, which corresponded with that which Lieutenant Dendrino was flying when killed. Lieutenant Dendrino was educated on the "Worcester," and entered the mercantile marine. Subsequently he was an officer in the P. and O. service, in which he held a Second Mate's certificate when he left in 1916 to join the R.F.C. He twice escaped shipwreck through being transferred from vessels which sank in the Channel immediately after, the last of these being the "Moloya." Second Lieutenant Dendrino was first under fire (as a P. and O. officer) at the landing and re-embarkation of the Indian Expeditionary Force at Tanga, in East Africa, where he was in charge of boats. His career in the R.F.C. was, perhaps, a record one. Without any previous knowledge of flying he gained his wings as a flying officer in less than six weeks, and in eight weeks was at the Front on active service, taking part in the bombing of Mons. He was the son of Mrs. Woodiwiss, and stepson of Mr. S. Woodiwiss, of Graveleys, Great Waltham, near Chelmsford, and a nephew (by marriage) of Major-General J. W. G. Tulloch, C.B., a distinguished Anglo-Indian soldier.

Second Lieutenant HERCULES RALPH LANGRISHE, Yeomanry, attached R.F.C., killed while flying on duty on February 16th, was the eldest son of Sir Hercules Langrishe, of Knocktopher Abbey, County Kilkenny. He was 29 years of age, and his commission in the Yeomanry was dated August 29th, 1914.

Lieutenant H. MATTHEWS, R.F.C., is reported as killed at the Front. Mrs. Harry Tindall, sister of Lieutenant Matthews, who resides in Falsgrave Road, Scarborough, has received the following letter from Lieutenant Douglas F. Woodford: "I regret to say that Leutenant Matthews was killed on January 15th in a combat with two German aeroplanes over the enemy's lines. His pilot also was killed. A message dropped later by the German Flying Corps informed us of their fate." A further letter states that Lieutenant Matthews died fighting against overwhelming odds. Lieutenant Matthews was in business in Hull when war broke out, and he enlisted in the East Yorkshire Regiment, subsequently receiving a commission and being transferred to the R.F.C. He was the son of Mr. Alfred Matthews, of Newboro Street, Bootham, York.

Second Lieutenant F. W. NISBET, R.F.C., killed while flying at the Front, aged 19, was the only surviving son of Mr. and Mrs. William Nisbet, of 8, Palace Road, Kingston-on-Thames. He was educated at Shrewsbury House School, Surbiton, and Marlborough, and enlisted in the Yorkshire Dragoons in August, 1914, being granted a commission in the same regiment in June, 1915. He transferred to the R.F.C. last September, and gazetted a flying officer in December, 1916. His elder brother, Lieutenant D. G. Nisbet, was killed last year.

Lieutenant N. W. STEWART, Royal Scots, attached R.F.C., who died of wounds on January 23rd, was the elder son of the Rev. Alexander Stewart, Hartington Place, Edinburgh, Minister Emeritus of Newton Stewart. He was a student of science and medicine at Edinburgh University, where he took first and second class certificates and a medal. He also had a gold medal and other prizes from the University O.T.C. He was a keen athlete.

Lieutenant SPENCER JOHN MEADOWS WHITE, Norfolk Regiment and R.F.C., reported killed, was the eldest son of the Rev. L. Meadows White, vicar of Potter Heigham and Repps, and Mrs. White, and eldest grandson of the late Prebendary Borrett White, of St. Paul's Cathedral. He was born in 1889, and was educated under Mr. J. Bruce Payne at St. Aubyn's, Lowestoft, and afterwards at Bishop's Stortford. He joined the Norfolk Regiment as dispatch rider in the first month of the war, obtained his commission in September, 1914, and took part in the landing at Gallipoli in August, 1915. He was removed, seriously ill, just before the evacuation, and spent some months in hospital and convalescent home in Alexandria. Later he was stationed in the desert near the Suez Canal, and joined the R.F.C. last summer. He was killed on January 15th in a fight with two fast German machines when on escort duty.

Second Lieutenant GORDON IVOR WILSON, Yeomanry, attached R.F.C., who died on February 12th as the result of a flying accident, was the only son of Mr. and Mrs. Alexander Mills Wilson, of Shovell, near Bridgwater. He had his commission in the Yeomanry in March, 1915.

Married and to be Married.

A marriage has been arranged, and will shortly take place, between Captain CEDRIC BOUSTEAD, Middlesex Regiment, attached R.F.C., third surviving son of Mr. and Mrs. J. M. Boustead, Westfield, Wimbledon Common, and DOROTHEA JOYCE, daughter of Mr. and Mrs. HUSEY-HUNT, of Hove, Sussex.

The marriage between Lieutenant C. S. J. GRIFFIN, the Gordon Highlanders and R.F.C., only son of Lieutenant-Colonel C. P. G. Griffin, D.S.O., and Mrs. Griffin, Berridon Hall, Bradworthy, Devon, and SYBIL K. E. OXENHAM only daughter of the late Samuel Oxenham, 8, Devonshire Place, Eastbourne, and Mrs. Glynn, wife of Colonel T. G. P. Glynn, C.M.G., The Grenfalls, Cheltenham, took place at St. Michael's Church, Chester Square, on Tuesday.

The marriage arranged between Lieutenant H. C. HIGGINBOTHAM, Argyll and Sutherland Highlanders, attached R.F.C., eldest son of R. K. Higginbotham, Braehead House, Bearsden, and CHRISTIAN, elder daughter of J. K. CATTO, J.P., Willaston House, near Chester, will take place shortly.

An engagement is announced between Lieutenant H. BAGSHAW MANN, R.F.C. (Military Medal), late Royal Fusiliers, only son of Mr. and Mrs. J. Bagshaw Mann, of Ealing, and MARGARET A. DUNK, only daughter of Mr. and Mrs. William Dunk, of Mount Park Road, Ealing.

The engagement is announced of Lieutenant STEWART W. THOMPSON, R.F.C., elder son of R. C. Thompson, Morton House, Fence Houses, and MADGE, widow of GORDON MILLS, Coldstream Guards, and elder daughter of H. Slowburn, Richmond House, Wimbledon Common.

The engagement is announced of NICHOLAS WYNDHAM WADHAM, Lieutenant, Rifle Brigade, and R.F.C., eldest son of Mr. and Mrs. J. C. Wadham, 5, Cleveland Terrace, Hyde Park, and BARBARA, only daughter of Mr. and Mrs. MORLEY MAY, of Brendon, Weston-super-Mare.

Items.

Memorial tablets have been erected in Harrow Parish Church in memory of Lieutenant G. J. L. WELSFORD, R.F.C., son of Mrs. Freeborn, wife of Major Freeborn, commanding the Harrow O.T.C., who was killed in an air fight in France and of Private F. W. OWEN, Royal Fusiliers, son of the Rev E. C. E. Owen, a Master at Harrow School, killed in action in France.

Second Lieutenant MARK DENMAN DRAPER, who was recently reported killed in a flying accident, was a well-known and popular member of the theatrical profession. He was the eldest son of the Rev. W. H. Draper, now Rector of Adel, near Leeds, and grandson of the late Mr. Justice Denman. Born 32 years ago at Alfreton, Derbyshire, where his father at that time was Vicar, he was educated at Repton School, and about ten years ago he adopted the dramatic profession, his initial experience being with Sir F. R. Benson. For a while he toured with Mr. Dobell's repertory company, and later joined Mr. Wentworth Croke, playing Oscar in "The Prodigal Son." Then he resolved to embark on management on his own account, and so continued for about seven years. Plays which he presented in the provinces included "The Christian," "The Eternal City" "What Every Woman Wants" and "The Blindness of Virtue." With the latter he occupied the Ambassadors' Theatre for a season prior to taking it on tour.

AIRCRAFT WORK AT THE FRONT.

OFFICIAL INFORMATION.

British. *Admiralty, February 14th.*

"On the 8th inst. a raid was carried out by naval aeroplanes on the shipping in Bruges Harbour. A number of heavy bombs were dropped with good effect. Large fires were observed. A hostile aeroplane was brought down.

"On the 10th inst. naval aircraft carried out a successful bomb attack in the Eastern Mediterranean, causing considerable damage to the permanent way south of Yenikeui Bridge."

General Headquarters, February 14th.

"One German aeroplane was destroyed in air fighting yesterday on our side of the line, and one of our machines was brought down."

Admiralty, February 15th.

"On the 14th inst. an attack was carried out by naval aeroplanes on the harbour and shipping of Bruges. A considerable weight of bombs was dropped with most successful results. All pilots and machines returned safely with the exception of one.

"*Eastern Mediterranean.*—On the morning of the 12th inst., during a reconnaissance, one of our aeroplanes was shot down by a Fokker. The pilot and observer were captured after having burnt their machine. A second Fokker was engaged and destroyed by an escorting machine at a range of 50 yards."

General Headquarters, February 15th.

"On the night of the 13th–14th inst., and again yesterday, bombs were dropped by our aeroplanes on a number of places of military importance behind the enemy's lines. One German machine was destroyed in the air fighting and two others driven down damaged. One of our machines was also brought down, and two others of our aeroplanes are missing."

General Headquarters, February 16th.

"Yesterday one British aeroplane and three German machines, one of which fell on our side of the line, were brought down in air fighting, while five other enemy machines were driven down damaged. A ninth hostile aeroplane was brought down by our anti-aircraft guns. Four other British machines are missing."

Admiralty, February 17th.

"An attack on the Ghistelles aerodrome (south of Ostend) was carried out by naval aeroplanes on the 16th inst. Heavy bombs were dropped, with good results.

"At the same time the shipping and harbour at Bruges were again attacked, bombs being observed to explode on the objectives."

General Headquarters, February 17th.

"In the course of air fighting yesterday one German aeroplane was brought down in our lines and two others were driven down in a damaged condition. One of our machines is missing."

French. *Paris, February 14th.*

"A German aeroplane this morning dropped bombs on Dunkirk, but there were no victims and no damage was done. Bombs also dropped in the region of Pompey (Meurthe and Moselle). Two civilians were killed and two others wounded.

"German aeroplanes again threw bombs in the evening in the Dunkirk district. Several civilians were killed and others injured. Nancy was also bombarded by aeroplanes this morning. There was no victim. During the night of Feb. 13th–14th our air squadrons dropped projectiles on the aviation grounds of Etreillers (Aisne) and Sancourt (Somme), on the stations of Athies, Houbleux, Voyennes, Curchy-St.-Quentin and Ham, as well as on the factories east of Tergnier, where several explosions were observed.

"*Salonica.*—The railway station of Krivolak was bombarded by French aeroplanes. A British air squadron blew up an ammunition depôt north of Demirhissar."

Paris, February 15th.

"Yesterday morning a German aeroplane was brought down in aerial fighting. The machine fell in flames in our lines between Custines and Morey (Meurthe-et-Moselle). In the course of the day yesterday and during last night our air squadrons successfully bombarded the aviation grounds at Colmar, Varennes and Matigny, the railway station of Athies, and the bivouacs at Curchy.

"A German aeroplane was brought down yesterday near Beaumont (Meuse) by the fire of our anti-aircraft guns."

Paris, February 16th.

"In the course of yesterday our battle aeroplanes fought a number of engagements, in which five German machines were brought down, one by Adjutant Madon, who thus scored his seventh succcess. During the night of the 15th–16th our air squadrons bombarded the railway station of Voyenne, the railways in the St. Quentin and Ham district, the bivoucas and the railway station at Spincourt, the blast furnaces at Uckingen, Rombach and Maizieres-les-Metz, the aviation ground and the barracks at Dieuze, and a military park to the north of Vic."

Paris, February 17th.

"Further information received shows that on Jan. 23rd Capt. Doumer brought down a German aeroplane. This is the fifth machine destroyed up to the present by this officer. Yesterday one of our pilots brought down a German captive balloon in the region of Marvaux (south of Vouziers)."

Paris, February 19th.

"On Saturday night a Zeppelin flew over the French coast of the Pas de Calais as far as the suburbs of Boulogne, and threw several bombs, without, however, achieving any results."

Russian. *Petrograd, February 13th.*

"North-east of Focsani a French aviator gave battle to an enemy aeroplane, which at the end of a few minutes descended rapidly, apparently damaged.

"Our aviators dropped four bombs on the enemy aerodrome in the village of Kobylnik (north of the Narocz Lake). Enemy aeroplanes dropped bombs on the Pogoreltsy Station on the Aleksandroff railway, also on Luzk and on the region south-east of Halicz."

Petrograd, February 15th.

"A French aviator brought down a German aeroplane, which fell into our lines south-west of Birlat. The enemy pilot was killed."

Italian. *Rome, February 13th.*

"A squadron of Italian seaplanes attacked Pola.

"After dropping a quantity of explosive and incendiary

bombs with visibly good results on the arsenal and vessels in the harbour, all the machines returned safely to their base.

"At 5 o'clock this morning a squadron of enemy airplanes made an aerial raid on Brindisi and dropped some bombs, which fell on a private residence and also on hospital train No. 45. Two civilians were wounded, and six men of the 1st Red Cross Company of Turin, two of them seriously."

Rome, February 15th.

"Enemy reconnoitring aeroplanes were driven off by our artillery fire and by our air squadrons."

German. *Berlin, February 15th.*

"The clear atmosphere favoured air activity from the Channel to the Vosges. The enemy lost yesterday seven aeroplanes, of which Lieut. von Richthofen shot down two, these making his twentieth and twenty-first victories in air battle."

Berlin, February 16th.

"Naval aeroplanes on the evening of Feb. 14th again successfully bombed the aerodrome at St. Pol, near Dunkirk. Hits and a conflagration were observed in the airsheds. On the return flight near Dunkirk the aviators observed the reflection of a fire, which was visible for a great distance. All our aeroplanes returned undamaged.

"The reciprocal aerial activity was very lively throughout the day and night. The enemy lost seven machines in aerial battles by the fire of our anti-aircraft guns and by infantry fire."

Berlin, February 17th.

"Our aeroplane squadrons copiously bombed important establishments behind the enemy front. On the Somme several munition dumps belonging to the enemy blew up. The report of the explosion and the shaking of the earth could be felt as far as St. Quentin."

Berlin, February 18th.

"During the night of Feb. 16th–17th one of our airships dropped bombs freely on the town and harbour of Boulogne.

"On Thursday night German aeroplanes dropped bombs on the aerodromes at St. Pol, near Dunkirk, and Coxyde. Hits on the buildings and aerodrome plants were observed."

Berlin, February 19th.

"The very hazy weather prevailing at the majority of the places on the front limited the activity of the artillery and of the airmen, and only permitted reconnoitring thrusts.

"*Macedonian Front.*—Two enemy aeroplanes were shot down."

Turkish. *Constantinople, February 14th.*

"*Dardanelles Front.*—Sub-Lieut. Mernike attacked three hostile aeroplanes and brought one down. The two British officers in charge of this machine were made prisoners."

Constantinople, February 18th.

"In the Dardanelles on Feb. 17th Lieut. Mernike brought down a British aeroplane armed with two machine guns, and the pilot was taken prisoner. The machine, which is almost intact and will be available for use after some slight repairs, is in our possession."

Bulgarian. *Sofia, February 12th.*

"Lively aerial activity in the Vardar Valley and along the coast of the Gulf of Orfano. East of the station of Dovo Sub-Lieutenant Braunnock brought down a British biplane, which crashed to earth. The pilot was killed."

Sofia, February 14th.

"Considerable aviation activity on both sides. An enemy aeroplane fell near Demir Hissar; the machine was undamaged and the pilot unhurt.

"Enemy aeroplanes dropped bombs unsuccessfully on the railway station of Oktchylar and on the road bridge near Buk."

Sofia, February 19th.

"Aerial activity on the whole front. An enemy aeroplane was brought down in the Cerna bend by artillery fire. Two enemy aeroplanes dropped eight bombs on Oktchylar railway station without doing any damage."

SIDE-WINDS.

FROM sewing machines to aeroplanes may seem a far cry, but one firm whose name is a household word in the former connection are busy turning out small metal fittings for aeroplanes.

MR. R. S. HUBBARD, who is joining Messrs. Handley Page, Ltd., as General Manager is well known as the Manager of Messrs. Beardmore's Aviation Department. After serving his time with the Fairfield Shipbuilding and Engineering Co., he had an extensive experience with that firm in charge of the building of torpedo boats, cruisers and battle cruisers. Subsequently he went to the United States to build Holland submarines, and from there went on to Japan, where he organised a yard for building submarines. Returning to the homeland, he joined the Beardmore firm, and after a spell at shipbuilding, undertook to organise the Beardmore Aviation Department, which he now leaves to come South. His enthusiasm and organising abilities will undoubtedly find full scope in the development of the Handley Page Co.

ON Monday last L. Blériot-Aeronautics moved to their new offices and works, and all communications should in future be addressed Blériot and Spad, Aircraft Works, Addlestone, Surrey, which is adjoining Addlestone Station on the London and South-Western Railway. The telephone call for the new address is Weybridge 353.

AMONG the big amounts received for the War Loan during the last days the lists were open may be noted: Vickers Ltd. (employees), £156,690; Rolls-Royce (directors, departmental managers, staff and employees), £151,300; Wm. Heaton and Sons, Bolton, £100,000; The Austin Motor Co., £100,000; C. A. Vandervell and Co., £64,800; Mr. R. Gliksten, of J. Gliksten and Co., £50,000; Mr. A. Mortimer Singer (additional), £50,000; G. Spencer Moulton and Co. (directors, staff and employees), £71,000; S. Smith and Sons (Motor Accessories), Ltd. (staff and employees, £20,000), £40,000; Wm. Beardmore, Ltd. (employees), £41,000; Waring and Gillow (employees), £17,500; Mr. L. Gliksten, £10,000; Mr. Claude Johnson, £10,000; Anglo-American Oil Co. (employees), £60,000; Armstrong, Whitworth and Co. (employees), over £50,000; Petters, Ltd., Yeovil, £10,000; Society of Motor Manufacturers and Traders, £10,000: Mrs. Herbert Austin, £5,000; A. V. Roe and Co. (employees), £5,125; M. L. Magneto Syndicate, £5,000.

WITH a view to helping on the Victory Loan, the staff and employees of the Sunbeam Motor Co., at Wolverhampton, taking a cue out of the Stock Exchange book, decided to run a sweepstake, but it was deliberately delayed until the last moment so that it should be merely supplementary to the workers' direct subscriptions to the War Loan through the Post Office or otherwise. It proved a gratifying success, the only fly in the ointment being that, in their modesty the moving spirits limited the tickets, at half-a-crown each, to 1,000, whereas five times the number could have been sold. All the tickets were bespoken three hours after they were available, and Mr. T. Barker, foreman of the erecting shop, and five colleagues who had generously guaranteed the purchase, were not called upon to shoulder their liability. Arrangements were made whereby, on drawing the numbers, applications went in direct in the winners' names. Perchance the system of drawing is worth noting against possible future efforts of this kind. Into each of three bags were put numerals from 0 to 9. One of the works' office girls was given charge of each of these bags, while three smaller girls picked a number out, each in turn, the numbers being drawn in the messroom and chalked on a blackboard against the prize number in the order in which they were drawn out. The prize-winners were: First, £50, E. Snead (new machine shop); second, £25, H. Ball (fitting and assembling); third, £15, H. W. Hubbard (new machine shop); fourth, £10, A. Cashmore (finishing). The next six, each of £5, were won respectively by H. Wilkes, J. Morris, T. C. Griffiths, E. Edwards, W. Howe and W. Parker.

LIEUT. GORDON W. LESTER, R.N.V.R. (R.N.A.S.), whose name appears in the *London Gazette* of February 6th, will be remembered by many of the little colony at Brooklands in the early days of aviation. Apart from his interest in flying, he is better known as an expert motorist of very wide experience, and he was recently acting as engineer in charge of the motor fuel and lubrication trials carried out by Messrs. C. C. Wakefield and Co.

IT is authoritatively stated that all the flying officers who have destroyed Zeppelins have used British magnetos, designed in Britain and made by British labour in all-British factories.

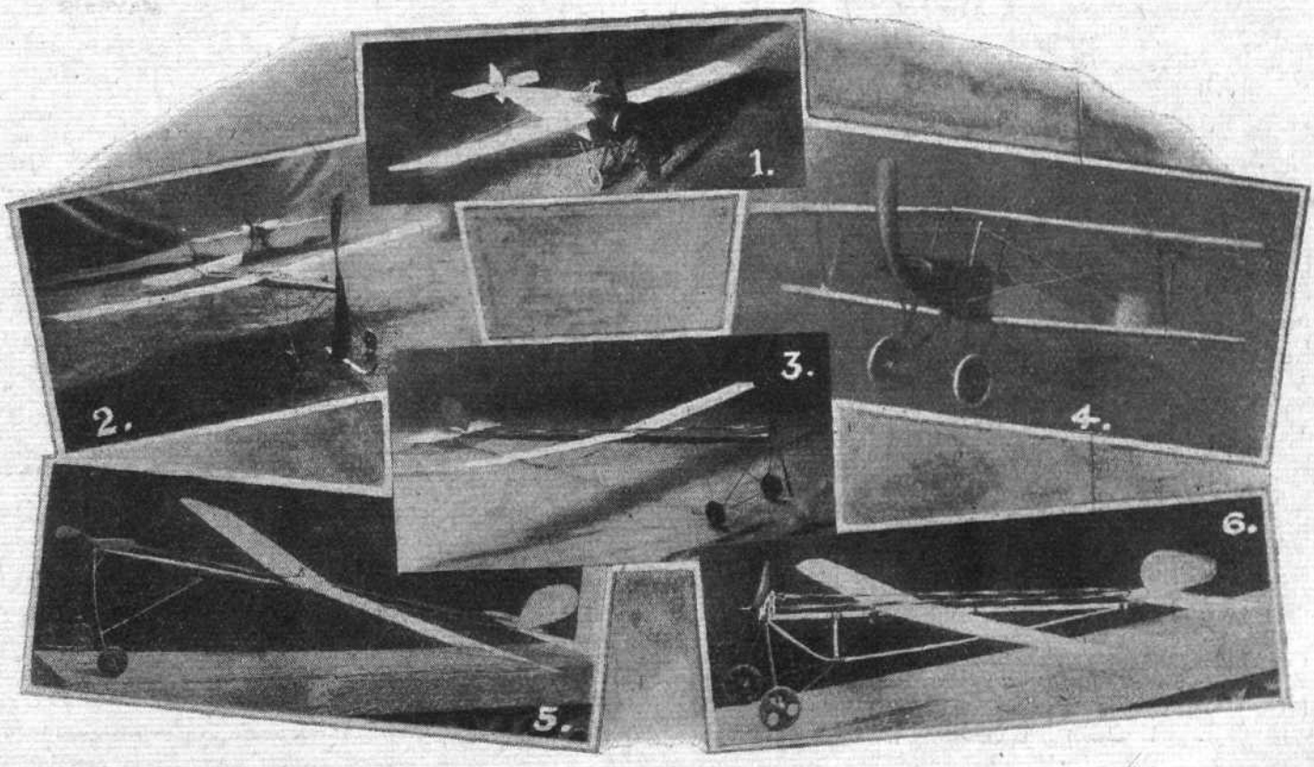
NOTHING succeeds like success, and it is not surprising therefore to hear that the Barimar scientific system of welding is making headway in connection with the repair of aeromotor smashes. In view of the unsatisfactory results obtained where the operation has not been properly carried out, it is

not surprising that welding has been somewhat under a cloud so far as aviation work is concerned. Experience, however, goes to show that when the repair is done in a scientific and thorough fashion, as in the Barimar workshops, an entirely sound job can be made. Some idea of the wide diversity of smashes successfully tackled and the extraordinary way in which seemingly hopeless fractures in almost any kind of metal have been made good by Barimar experts, is given in a 20-page two-colour folder, "Straight Facts about Welding," from the pen of Mr. C. W. Brett, the managing-director of Messrs. Barimar, Ltd., 10, Poland Street, W. The photos. in the brochure show that it is practically impossible to see where the repair has been made by the Barimar experts' Every user of machinery in these days is often at a loss to know how he can keep the wheels running, but a perusal of the booklet will leave him in no doubt as to how to proceed when something breaks and no spares are available. A copy can be had on application to Barimar, Ltd.

Models

A Few Models of the Finsbury Park and District Club.

Most of the model clubs have had to suspend their activities since the outbreak of war owing to the majority of their members joining up with one or other of the Flying Services, but one club which has been able to "carry on" and put in useful work is the Finsbury Park and District Club. Their recent doings have been set out in the monthly reports, and doubtless other model makers will be interested in the photographs and particulars of some of the models which appear below, which have been sent by the Hon. Secretary, Mr. F. E. Rayner. We should be pleased to receive similar photographs and details from other clubs:—



"All the flying models, with the exception of that shown in No. 6, are fitted with hollow-spar bodies. A point worthy of note is that practically all the material used in the construction of the models was supplied by Messrs. A. E. Jones, Ltd., of New Oxford Street, W.

"Photograph No. 1 is a scale model Morane-Saulnier monoplane constructed by the Secretary, Mr. F. E. Rayner. The dimensions were taken from the scale drawings which appeared in 'FLIGHT' of May 24th, 1913, and the model, which took several months to build, was completed, with the exception of the engine, on August 18th, 1916. In the cock pit a pilot's seat is fitted and also a dummy dash-board. Both the rudder and elevator are operated by the usual controls. The planes and *fuselage* are built up and covered with fabric doped with Cellon and enamelled. The scale is $\frac{9}{16}$ in. to a foot.

"No. 2 is the same member's large tractor monoplane. This model flies a distance of approximately 500 yards, and is very fast. The leading dimensions are: Span, 3 ft. 6 ins.; chord, 5½ ins.; length overall, 4 feet; area of tail, 55 square ins.; area of aluminium fin, 9 sq. ins; 12-in. tractor-screw; power, 6 strands of ¼-in. strip rubber, and weight 5½ oz. Rubber tyred wheels are fitted.

"No. 3 is Mr. E. Coleman's model. In size and efficiency it is very similar to Mr. Rayner's, but it varies to a considerable extent in detail. Some very ingenious fittings are employed, notably the bearing and a wire clip. The latter is made out of a single piece of 20 S.W.G. steel wire and holds both the tail and aluminium rudder in position. The dimensions are: Span, 3 ft.; chord, 4¼ ins.; over all length, 3 ft. 6 ins.; area of elevator, 60 sq. ins.; area of rudder, 9 sq. ins.; 12-in. tractor-screw, driven by 5 strands of ¼-in. strip rubber. Rubber tyred wheels are fitted and the total weight does not exceed 4½ ozs. The best duration to date is 65 seconds, and distance 550 yards.

"The model shown in No. 4 is a scale Nieuport biplane, constructed by Mr. A. Richards, from the drawings which appeared in 'FLIGHT' on October 19th, 1916. This model is also waiting for its dummy engine. The planes and *fuselage* are covered with veneer and enamelled. A pilot's seat is provided and the elevator and rudder are workable. The scale is ⅜ in. to a foot.

"No. 5 represents a fine model made by Mr. C. J. Burchell. No nails whatever are used in the construction of the plane, the ribs being attached to the main spars by aluminium clips. At the time of writing the machine had only been tested once, and on this occasion it showed itself to be a very steady, slow flyer. The chassis is collapsible, and the wheels are streamlined. The dimensions are: Span, 4 ft.; chord, 5 ins., increasing to 6 ins. at tips; length overall, 3 ft. 5 ins.; 12½-in. tractor-screw, driven by 4 strands of thick ¼-in. strip rubber, and the weight complete is 6 ozs.

"No. 6 is a model by C. Burchell (jun.). This machine has also only been tested once, when it was found that it required a larger propeller. The chief feature of this model is the geared motor. Particulars: Span, 3 ft.; chord, 4¾ ins.; area of elevator, about 60 sq. ins., and length overall, 3 ft. Four strands of ¼-in. rubber are used, two on each hook. The body is built up."

A NEW FLYING "WARM."

DESIGNED by an R.N.A.S. pilot, and made by Robinson and Cleaver, of Regent Street, the latest thing in warm clothing for cold weather flying has the weight of experience behind it. A man whose business it is to pass a good deal of his time at 20,000 feet in wintertime should have his own ideas as to what is necessary to keep him warm. When he takes that idea to a firm such as Messrs. Robinson and Cleaver, capable of carrying out those ideas and with a reputation to lose, the production emanating from their combined efforts should be something approaching very near the ideal article. The garment here spoken of is not a flying-coat, but a single piece article, that is, body and leg-covering all in one, after the style of the one-piece overall. The outer side is made of brown, waterproofed twill, and the inner lining is of mohair, whilst in between the two is an inter-lining of rubber cloth. The garment is donned in the same way as the one-piece overall, and when it is fastened about the waist in the usual

manner, there is a very wide double-flap breast piece, the under one passing right across the chest, and the outer one fastening right across on the other side near the shoulder. In addition the heavy fur collar is exceedingly deep, and when turned up covers the ears and the back of the head almost to the top of the cap. It has the usual strap back, but in the breast is but one pocket. The "handy" pockets, two in number, are not in the usual place at the breast, but are situated where they are certainly convenient, namely, one on each side of the leg, about the middle of the thigh, and rather to the front. Buttons at the wrists and ankles enable one to keep the cold draught from the limbs, whilst a large storm piece is provided to fasten across the throat. The garment which the writer saw was not a new one, but had come back from many weeks' active service "out there," where it had been taken to be put through its paces under active service conditions, proof of which was very apparent in the dirt and oil plentifully in evidence. The pilot for whom the garment was made, reports that he never felt the least cold when wearing it, and was in every way satisfied that the "Rig" was the very best thing that could possibly be had for the job.

It has been banteringly stated that at 20,000 ft. it is comfortably warm, at 10,000 ft. so hot it makes one perspire, and on the ground it really needs water-cooling. Anyway, it is certainly an ideal garment for winter flying, and Messrs. Robinson and Cleaver are at liberty to allow other pilots to benefit by adding to their kit one of these unique "warms," for which they are now prepared to take orders to measure.

The Government Aircraft Insurance Scheme.

IT was announced on February 17th that the discount of 50 per cent. in respect of new insurances against enemy aircraft and bombardment risks, will be allowed on insurances and renewals effected from February 17th onwards instead of from March 1st as originally announced.

In the House of Lords on Tuesday, Lord Hylton, replying to Lord Parmoor, said that it would be unfair to blame the insurance companies because the premiums which were originally fixed at a time when no precedent existed as a guide were higher than experience had proved necessary. From February 17th the rates had been reduced by 50 per cent. Under the agreement between the insurance companies and the Government it was arranged thar the accounts should be as simple as possible. There were other reasons why detailed information could not be given, but these reasons he was not at liberty to disclose.

COMPANY MATTERS.

NEW COMPANIES REGISTERED.

AEROPLANE GENERAL SUNDRIES, LTD.—Capital £100, in £1 shares.

ASSOCIATED BRITISH MACHINE TOOL MAKERS, LTD., 34, Victoria Street, S.W.—Capital £100,000, in £1 shares. Machine and engineering tool manufacturers, makers of appliances used in the manufacture of motor cars, aircraft, &c. First directors: W. F. Clark, J. W. S. Asquith, S. H. March, A. H. Baldwin, W. B. Lang, A. E. Matthewson, W. G. Shanks, W. D. Ford-Smith, E. Williams and H. Butler.

AVIATION SYND. LTD., 6A, Bedford Square, W.C.—Capital £2,200, in 2,000 10 per cent. cum. pref. shares of £1 each and 4,000 ordinary shares ol 1s. each.

LEGAL INTELLIGENCE.

General Aviation Contractors, Ltd.

A PETITION by Mr. D. L. Santoni for the compulsory winding up of the Company, which was opposed by the liquidator on behalf of the Company, was heard on the 13th inst. at an adjourned hearing, before Mr. Justice Astbury, when an order was made for the compulsory winding up of the Company.

PUBLICATION RECEIVED.

War Flying: the Intimate Record of a Pilot. London: John Murray. Price, 1s. net.

Aeronautical Patents Published.

Applied for in 1916.

The numbers in brackets are those under which the specifications will be printed and abridged, &c.

Published February 15th, 1917.

1,189. WESTERN ELECTRIC CO. AND G. H. NASH. Telephonic receiving apparatus for aviators, &c. (103,341.)

6,149. A. A. HOLLE, A. W. JUDGE AND VARIOPLANE CO. Planes, &c. (103,400.)

Index and Title Page for Vol. VIII.

The 8-page Index for Vol. VIII of "Flight" (January to December, 1916) is now ready, and can be obtained from the Publishers, 44, St. Martin's Lane, W.C., Price 6d. per copy, post free.

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